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NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE, --ETC(U)
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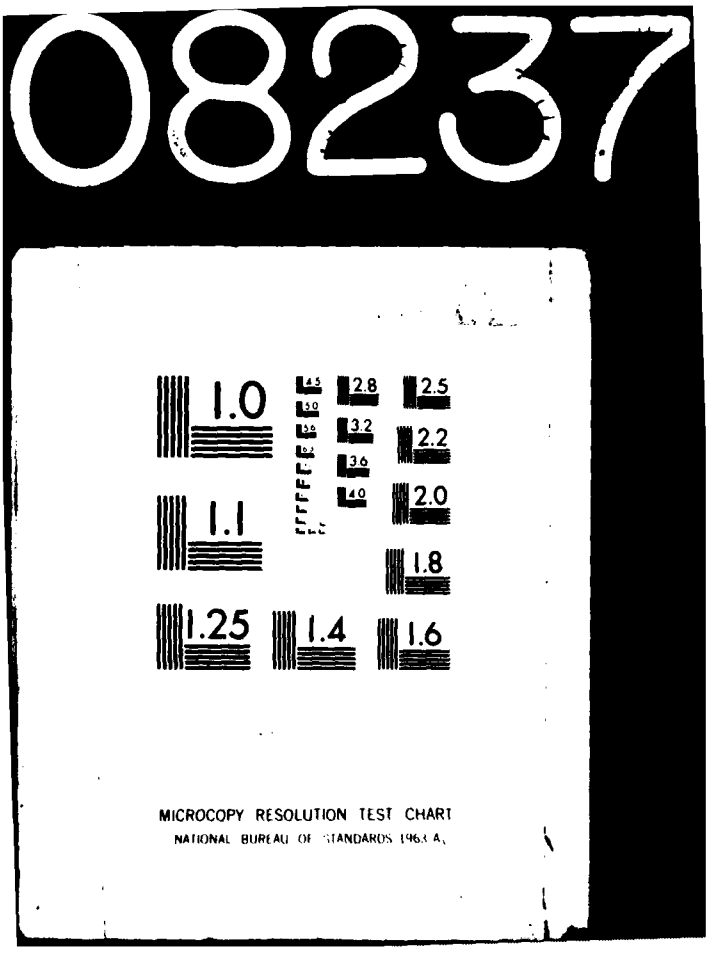
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
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4. TITLE (and Subtitle) National Program of Inspection of Non-Federal Dams, Tennessee. Coon Creek Dam (Inventory Number TN 04508) near Lenox, Tennessee, Dyer County, TN., Obion River Basin.	5. TYPE OF REPORT & PERIOD COVERED Phase I Investigation Report
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s) DACW-62-81-C-0056
9. PERFORMING ORGANIZATION NAME AND ADDRESS Tennessee Department of Conservation Division of Water Resources 4721 Trousdale Dr., Nashville, TN. 37220	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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Lenox, TN.
Dyer County, TN.
Embankments
Visual Inspection
Structural Analysis

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Report is based on the findings of the Phase I investigation of OFDBA Site #60-6 on February 4 1981 in accordance with "Recommended Guidelines for Safety Inspection of Dams" Office of the Chief of Engineers. The earth dam is 54 feet high and 726 feet long with a crest width of 25 feet. At normal pool the dam impounds a 125 acre lake (2137 acre-feet) used for flood control. It is in the intermediate size and high hazard potential category. The downstream slope is 2.6H:1V and the upstream slope is 3H:1V. The embankment has moderate slopes and exhibited no signs of instability or uncontrolled seepage. Erosion is a major

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

problem at this time as indicated by the presence of deep holes and gullies on the upper portion of the embankment and in the emergency spillway. Large holes were also observed below the right toe of the dam near the creek channel. The emergency spillway is a 250 foot wide grassed channel at the left abutment. There was no evidence that the spillway had ever carried flow. The principal spillway is a 36 inch diameter CMP riser with a 30 inch concrete pipe outlet. An 18 inch manually operated headgate is located at the base of the riser and is used to lower the lake level. A hydraulic and hydrologic analysis indicated that the spillway is capable of passing the recommended probable maximum flood (PMF). The dam is classified as "unsafe non-emergency" due to the erosion on the embankment and the large holes just below the dam. It is recommended that a qualified engineer be retained to analyze the fill material for dispersive soils and make appropriate recommendations for repairing eroded areas and prohibit future erosion. It is also recommended that holes which have developed downstream of the dam be further investigated to determine their relationship to the safety of the dam.

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

IN REPLY REFER TO
ORNED-G

2 SEP 1981

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Furnished herewith is the Phase I Investigation Report on OFDBA Site #60-6 (Coon Creek Dam) near Lenox, Tennessee. The report was prepared under the authority and provisions of PL 92-367, the National Dam Inspection Act, dated 8 August 1972.

The report presents details of the field inspection, background information, technical analyses, findings, and recommendations for improving the condition of the dam.

Based upon the inspection and subsequent evaluation, OFDBA Site #60-6 (Coon Creek Dam) is classified as unsafe-nonemergency due to the large sinkholes located at the toe of and just downstream of the dam.

We do not consider this an emergency situation at this time, but the recommendation to engage the services of a qualified engineer to investigate these sinkholes and others contained in this report should be undertaken promptly to minimize the risk to the numerous family dwellings located downstream.

Public release of the report and initiation of public statements fall within your prerogative. However, under provisions of the Freedom of Information Act, the Corps of Engineers is required to respond fully to inquiries on information contained in the report and to make it accessible for review on request.

Your assistance in keeping me informed of any further developments will be appreciated.

Sincerely,

LEE W. TUCKER
Colonel, Corps of Engineers
Commander

1 Incl
As stated

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

Name of Dam ..... OFDBA Site #60-6 (Coon Creek)

County ..... Dyer

Stream ..... Coon Creek

Date of Inspection ..... February 4, 1981

This investigation and evaluation was prepared by the Tennessee Department of Conservation, Division of Water Resources.

PREPARED BY:

Robert Ramsey
Regional Engineer

APPROVED BY:

Edmond O'Neill
Chief Engineer
Safe Dams Section

APPROVED BY:

Robert A. Hunt, P.E.
Director, Division of
Water Resources
Tennessee Department
of Conservation

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam ..... OFDBA Site #60-6 (Coon Creek)

County ..... Dyer

Stream ..... Coon Creek

Date of Inspection ..... February 4, 1981

ABSTRACT

This report is based on the findings of the Phase I investigation of OFDBA Site #60-6 on February 4, 1981. This study was done in accordance with "Recommended Guidelines for Safety Inspection of Dams", Office of the Chief of Engineers.

The earth dam is 54 feet high and 726 feet long with a crest width of 25 feet. At normal pool the dam impounds a 125 acre lake (2137 acre-feet) used for flood control. It is in the intermediate size and high hazard potential category. The downstream slope is 2.6H:1V and the upstream slope is 3H:1V.

The embankment has moderate slopes and exhibited no signs of instability or uncontrolled seepage. Erosion is a major problem at this time as indicated by the presence of deep holes and gullies on the upper portion of the embankment and in the emergency spillway. Large holes were also observed below the right toe of the dam near the creek channel.

The emergency spillway is a 250 foot wide grassed channel at the left abutment. There was no evidence that the spillway had ever carried flow. The principal spillway is a 36 inch diameter CMP riser with a 30 inch concrete pipe outlet. An 18 inch manually operated headgate is located at the base of the riser and is used to lower the lake level. A hydraulic and hydrologic analysis indicated that the spillway is capable of passing the recommended probable maximum flood (PMF).

The dam is classified as "unsafe non-emergency" due to the erosion on the embankment and the large holes just below the dam. It is recommended that a qualified engineer be retained to analyze the fill material for dispersive soils and make appropriate recommendations for repairing eroded areas and prohibit future erosion. It is also recommended that holes which have developed downstream of the dam be further investigated to determine their relationship to the safety of the dam.

OVERVIEW PHOTOGRAPH

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LIST OF APPENDICES

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
OFDBA SITE #60-6 (COON CREEK)
DYER COUNTY, TENNESSEE

SECTION 1 - GENERAL

1.1 Authority - The Phase I inspection of this dam was conducted under the authority of Tennessee Code Annotated, Sections 70-2501 to 70-2530, The Safe Dams Act of 1973, and in cooperation with the U. S. Army Corps of Engineers under the authority of Public Law 92-367, The National Dam Inspection Act.

1.2 Purpose and Scope - The purpose of the Phase I inspection is to develop an engineering assessment of the general conditions of a dam with respect to safety and stability. This is accomplished by conducting a visual inspection, reviewing any available design and construction data, and performing appropriate hydraulic, hydrologic, and other analyses. A comprehensive description of the Phase I investigation program is given in Recommended Guidelines for Safety Inspection of Dams, by the Department of the Army, Chief of Engineers, Washington, D. C. 20314.

1.3 Past Inspections - On November 22, 1978, personnel from the Tennessee Department of Conservation, Division of Water Resources, performed a visual inspection of the dam in pursuance of issuance of a Certificate of Approval and Safety for operation of the structure in accordance with provisions of the "Safe Dams Act of 1973". The construction was noted to be in compliance with approved plans; however, several erosion gullies had formed on the dam and in the spillway. One gully on the dam was noted to be 2.5 feet deep. Verbal approval to operate the structure was given on January 2, 1979. No Certificate for operation has been issued.

1.4 Details of Inspection - The Phase I inspection was conducted on February 4, 1981. The weather was clear and windy, with a temperature of about 30°F. The reservoir was 4-5 feet below normal pool level, elevation 380.

1.5 Inspection Team Members - The inspection was conducted by the following State personnel:

Edmond O'Neill
Robert Ramsey
George Moore

The inspection team was accompanied and briefed by Bill Owens and Joe Kerley of the Obion-Forked Deer Basin Authority, which sponsored the project.

SECTION 2 - PROJECT DESCRIPTION

2.1 Location - The dam is located in Dyer County, about one mile northeast of the Lenox, Tennessee community and 5 miles northwest of Dyersburg, Tennessee. It impounds a 125 acre lake on Coon Creek in Peck Hollow. The dam is located (not shown) on the U. S. Geological Survey 7.5 minute Dyersburg quadrangle map at north latitude $36^{o}05'36"$ and west longitude $89^{o}28'49"$. Location maps are provided in Appendix B.

2.2 History of Project - The dam was constructed to provide flood control in the Obion-Forked Deer River Basin. It was designed by Continental Engineering Company under contract with the Obion-Forked Deer Basin Authority (OFDBA). The Basin Authority is a State of Tennessee government agency created in 1972 to develop and implement plans and programs for comprehensive development including the control and development of the water and related land resources of the Obion-Forked Deer Basin.

The owner of the dam is Mr. Bert Viar of Dyersburg, Tennessee, who is responsible for general maintenance and operation. Easement rights for the lake and dam site are retained by the OFDBA, which is responsible for maintenance and deficiencies related to design and construction.

A Certificate of Approval and Safety for construction was issued to the Basin Authority by the Department of Conservation in July of 1977 as required by the "Safe Dams Act of 1973".

In 1978, construction of the dam was halted due to legal action against the Basin Authority. At this time, the dam was complete except for sodding, seeding, and some grading in the barrow area. During the delay, the embankment was severely eroded due to lack of vegetative cover and extensive filling and regrading was needed. In the latter months of 1979, concrete drainage channels were installed on the berms on the downstream slope and the emergency spillway to channel runoff away from the slopes.

2.3 Size and Hazard Classification - The dam is in the intermediate size category with a maximum height of 54 feet and a storage capacity of 2137 acre-feet at normal pool. The structure is classified in the high hazard potential category because sudden failure of the dam could damage several family dwellings, a church, and a school in the Lenox community located 1-2 miles downstream and result in possible loss of life.

2.4 Description of Dam and Appurtenances

2.4.1 Embankment - The dam is a linear aligned homogeneous embankment constructed of loessial material. The embankment is 54 feet high, measured from the low point on the crest to the streambed. The crest is 726 feet long, 25 feet wide, and varies in elevation from 391.5 to 392.7.

Above the water level, the upstream slope is 3H:1V. According to design drawings, there is a 10 foot wide berm on the upstream slope at elevation 360. The berm was reportedly added to increase the safety factor against circular arc failure. At normal pool level, a wooden breakwater fence constructed of 2" x 12" treated boards is provided to decrease erosion from wave action (photo no. 1).

According to plans, the dam was designed with 3:1 slopes and two 10' berms on the downstream slope. Actual measurements show a downstream slope of 2.6H:1V with a 15' berm at elevation 374.9 and a 17' berm at elevation 361.3. The purpose of these berms is to control surface water runoff and thereby reduce erosion on the slopes. They also were to provide increased earthquake resistance.

The geologic formation of the area consists of thick loessial deposits of clayey silt overlying a 0-30 foot gravelly sand layer followed by massive clay of the Jackson Formation. According to the geotechnical report, the soils in the abutment used for fill material are generally of low plasticity but contain significant amounts of clay. These soils gain strength from partial saturation but lose strength upon saturation. Test borings along the dam centerline indicate that the fill material and foundation consist mainly of a brown silt classified as ML material using the

Unified Soil Classification System. A detailed geotechnical report prepared by Spigolon Engineering Laboratories, Inc. is contained in Appendix E and includes logs of test borings.

The gravelly layers represent a pervious stratum in the dam foundation. Correspondence indicates that there was some concern over the possible development of sand boils and piping in the old creek bed or impact basin caused by a downstream blockage. (Refer to correspondence from S. J. Spigolon to the OFDBA dated April 8, 1977.)

A blanket toe drain consisting of a graded sand filter was installed to control any seepage. The sand filter extends 12 feet to intercept the pervious stratum and act as a pressure relief trench. Two 8-inch perforated fiber pipes and one 8-inch perforated PVC pipe wrapped in filter cloth collect the seepage and discharge it into the original creek channel. According to the engineering in charge, David Rauchle, two drainage systems were installed, one according to specifications and one, due to contractor's error, using the wrong pipe (flexible drainage line). At the outlet, the three pipes are encased in concrete and are supported on a small concrete slab (photo no. 14).

2.4.2 Principal Spillway - The principal spillway is a 36-inch diameter CMP drop inlet riser with a 54-inch CMP anti-vortex baffle. The outlet from the riser is a 30-inch steel cylinder concrete pipe that extends under the fill material and connects to a 30-inch CMP at an elbow joint just aft of the downstream toe. According to plans, a reinforced concrete thrust block is provided at the elbow joint. The concrete pipe is laid on a concrete bedding and has nine reinforced concrete anti-seep collars. The CMP outlet is laid in natural ground and has seven steel slippage collars. The pipe empties into a riprapped earth impact basin.

2.4.3 Emergency Spillway - The emergency spillway consists of a 250 foot wide grassed channel excavated from the left abutment (photo no. 17). The crest of the spillway is at elevation 385.6. The left side slope is 5.6H:1V and the right side slope is 5.7H:1V. The emergency spillway area was the main borrow source for the embankment fill. The usage interval for usage of the emergency spillway is greater than 100 years.

2.4.4 Downstream Channel - The downstream channel is a winding earth channel with nearly vertical side slopes. Erosion of the channel is slight and there is little or no vegetative protection.

2.4.5 Reservoir and Drainage Area - At normal pool level the reservoir has a surface area of 125 acres and a storage capacity of 2137 acre-feet. At the top of the dam the reservoir capacity was estimated to be 3900 acre-feet. The drainage area is 1290 acres, most of which is heavily wooded with a good ground cover. Slopes in the watershed average approximately 17 percent.

SECTION 3 - FINDINGS

3.1 Visual Findings

3.1.1 Embankment - The downstream slope is 2.6H:1V with a 15 foot berm at elevation 374.9 and a 17 foot berm at elevation 361.3 (photo no. 5). The crest and slopes are uniform and showed no cracks, unusual settlement, or other signs of slope instability. Numerous gullies were observed on the upstream slope, most about 4 feet above normal pool level. These gullies were up to 4 or 5 feet deep (photo no. 4). Grass cover in this area is a well established fescue. There was also significant erosion at the base of the breakwater fence, which was exposed due to the low level of the lake (photo nos. 2 & 3).

Deep holes associated with erosion were also found on the downstream of the crest. The holes appeared to exit on the downstream slope above the upper berm. Fill material was deposited in the concrete drainage channel below (photo no. 8). The deepest hole on the crest was measured to be 8 feet deep vertically (photo no. 6) and appeared to exit from a large hole on the downstream slope (photo no. 7). This hole appeared to be located in line with the drain pipe that extends beneath the dam. There was no evidence to indicate that fill material is entering the pipe. Another large hole is located on the downstream side of the crest near the right end (photo no. 9). The hole is about 3 feet in diameter and several feet deep. It appeared that it is associated with several smaller holes on the downstream slope above the upper berm. Fill material was also observed in the concrete drainage channel in this area.

A small clear flow (less than 1 gpm) was issuing from the right toe drain and there was a similar flow from beneath the concrete supporting slab that has undercut the earth below it (photo no. 14). There was no flow from the 8-inch PVC pipe which is also provided to drain foundation seepage. The flow beneath the supporting slab is thought to be escaping flow from the toe drains as all lines are perforated their entire length.

A group of irregular shaped holes were observed about 40 feet downstream of the dam near the toe drain outlets. The exact cause of these holes could not be determined. They had the same appearance as holes observed on the dam (photo no. 15) and appear to be connected by an underground channel carrying a small flow from a minor tributary below the dam. Another such hole was observed about 60 feet downstream of the right toe of the dam in a fenced pasture. It contained no flow but was similar in appearance (photo no. 16).

3.1.2 Principal Spillway - The riser pipe was not inspected. There has been no past history of any structural or operational problems. The visible portion of the anti-vortex baffle and the CMP outlet pipe showed no evidence of deterioration (photo no. 10).

3.1.3 Emergency Spillway - Several large eroded gullies (from surface runoff) were observed in the emergency spillway entrance and exit channels (photo nos. 18 & 19). These gullies appeared similar in shape to those found on the upstream slope. The channel has a medium grass cover and there was no indication that it has ever carried flow.

3.1.4 Drawdown Facilities - The drain gate was not operated during the inspection. Representatives of the OFDBA indicated that the gate was last operated in 1979 to lower the reservoir while repairs were being made to the embankment and barrow areas.

3.1.5 Downstream Channel - The downstream channel is variable in width and has almost vertical earth side slopes (photo no. 12). The excavated earth channel below the drain pipe is wet on the side adjacent to the dam and had sloughed (photo no. 13). The opposite side of the channel was dry. Riprap in the impact basin was in good condition (photo no. 11).

3.1.6 Reservoir and Drainage Area - The reservoir bank slopes are generally steep (photo no. 22). The turbidity was low and there was no evidence of sedimentation.

The drainage area is mostly wooded with some cleared land on the hilltops. There have been no significant changes in land use since the dam was constructed. Slopes adjacent to the reservoir are about 30 percent.

3.2 Review of Data - Information available for review included design drawings, specifications, hydraulic and hydrologic data, and a geotechnical investigation report. Construction, operation, and maintenance information was provided by the Obion-Forked Deer Basin Authority. Information obtained and reviewed have been incorporated into this report. Copies of the design drawings and the geotechnical report are provided in Appendix F.

3.3 Static and Seismic Stability - The actual margin of safety for static stability cannot be determined because the engineering data required for analytical stability analyses are not available. An assessment of the embankment stability based on visual evidence and engineering judgment indicate a stable structure due to moderate embankment slopes and no signs of differential settlement, cracks, slides, or serious leaks or seepage.

The project is located in Seismic Zone 3, indicating that there could be major damage from seismic activity in the area. However, the original design of the dam included the addition of berms on both slopes to allow for earthquake stresses.

3.4 Hydraulic and Hydrologic Analysis - According to OCE guidelines, the recommended design flood for an intermediate size dam in a high hazard potential area is the probable maximum flood (PMF). Hydraulic and hydrologic analyses indicate that the dam has sufficient spillway capacity to pass the PMF under average antecedent moisture conditions with 2.1 feet of freeboard. Additional calculations indicate that the spillway will pass the PMF (AMC III) with 1.2 feet of freeboard.

3.5 Conclusions and Recommendations

3.5.1 Conclusions - The dam appears to be stable; however, of particular concern are the large holes

just downstream of the toe of the dam. The condition of the slopes is gradually deteriorating due to erosion believed to be associated with dispersive soils.

The project is located in seismic zone 3. Stability analysis of the embankment with earthquake loading is not within the scope of this report. As indicated in the geotechnical study for the project design, the slopes were designed with berms to allow for earthquake stresses.

Hydraulic and hydrologic analysis indicates that the storage/spillway capacity is adequate to pass the probable maximum flood as recommended by OCE guidelines for dams of intermediate size and high hazard potential.

The dam is classified as "unsafe non-emergency" due to the erosive holes on and just downstream of the dam.

3.5.2 Recommendations - A qualified engineer should be engaged to:

a. Investigate the cause of the erosive holes on the dam and near the downstream toe of the dam and make recommendations for needed repair. An investigation for the presence of dispersive soils should be included and appropriate recommendations made for treatment if needed.

b. Investigate and make recommendations concerning the leakage under the toe drain exit slab.

All surface erosion should be repaired.

A program of general maintenance and periodic inspection should be established.

An emergency action plan should be developed to alert downstream residents should a serious problem develop with the project.

SECTION 4 REVIEW BOARD FINDINGS

The Interagency Review Board for the National Program of Inspection of Non - Federal Dams met in Nashville on 21 May 1981 to examine the technical data contained in the Phase I investigation report on OFDBA Site #60-6 (Coon Creek Dam). The Review Board considered the information and recommended that (1) the recommendations be revised to describe indetail the possible dangers that the sink holes may present, and (2) the condition classification be changed from "significantly deficient to "unsafe - nonemergency". They agreed with other report conclusions and recommendations. A copy of the Review Board's letter report is included in Appendix G.

APPENDIX A

DATA SUMMARY

APPENDIX A
DATA SUMMARY

A.1 Dam

A.1.1 Type - Homogeneous earthfill

A.1.2 Dimensions and Elevations - Elevations are expressed in feet and are referenced from the drain pipe invert, shown on design drawings to be elevation 341.

a. Crest length - 726'
b. Crest width - 25'
c. Height - 54.6'
d. Crest elevation (low point) - 391.5
e. Embankment slope, U/S - 3H:1V
f. Embankment slope, D/S - 2.6H:1V
g. Size classification - Intermediate

A.1.3 Zones, Cutoffs, Grout Curtains - Graded sand horizontal toe drain extends 12 feet into sandy foundation material.

A.1.4 Instrumentation - None

A.2 Reservoir and Drainage Area

A.2.1 Reservoir

a. Normal Pool

1) Elevation - 380 feet
2) Surface area - 125 acres
3) Storage - 2137 acre-feet
4) Length - 8000 feet

b. Flood Pool (crest of emergency spillway)

1) Elevation - 385.6 feet
2) Surface area - 150 acres
3) Storage - 2825 acre-feet

c. Maximum Pool (top of dam)

1) Elevation - 391.5 feet
2) Storage - 3900 acre-feet

A.2.2 Drainage Area

a. Size - 1290 acres
b. Average slope - 17%
c. Soils - Memphis silt loam
d. Land use - Woodland
e. Runoff (AMC II)

1) PMF - 23.3 inches
2) ½ PMF - 11.65 inches
3) 100-year flood - 1.8 inches

A.3 Outlet Structures

A.3.1 Drawdown Facilities

a. Type - 18" slide headgate with operating stem
b. Control - Manual

A.3.2 Principal Spillway

a. Type - 36" diameter CMP riser, 30" diameter CMP concrete pipe outlet
b. Crest elevation - 380 feet

A.3.3 Emergency Spillway

a. Type - Saddle type at left abutment
b. Width - 250 feet
c. Crest elevation - 385.6 feet

A.4 Historical Data

A.4.1 Construction Date - 1978

A.4.2 Designer - Continental Engineering

A.4.3 Builder - Obion-Forked Deer Basin Authority
Sandwood Construction Company

A.4.4 Owner - Bert Viar

A.4.5 Previous Inspections - Tennessee Department of Conservation, Division of Water Resources
November 22, 1978

A.4.6 Seismic Zone - 3

A.5 Downstream Hazard Data

A.5.1 Downstream Hazard Potential Classification

a. Corps of Engineers - High
b. State of Tennessee - 1

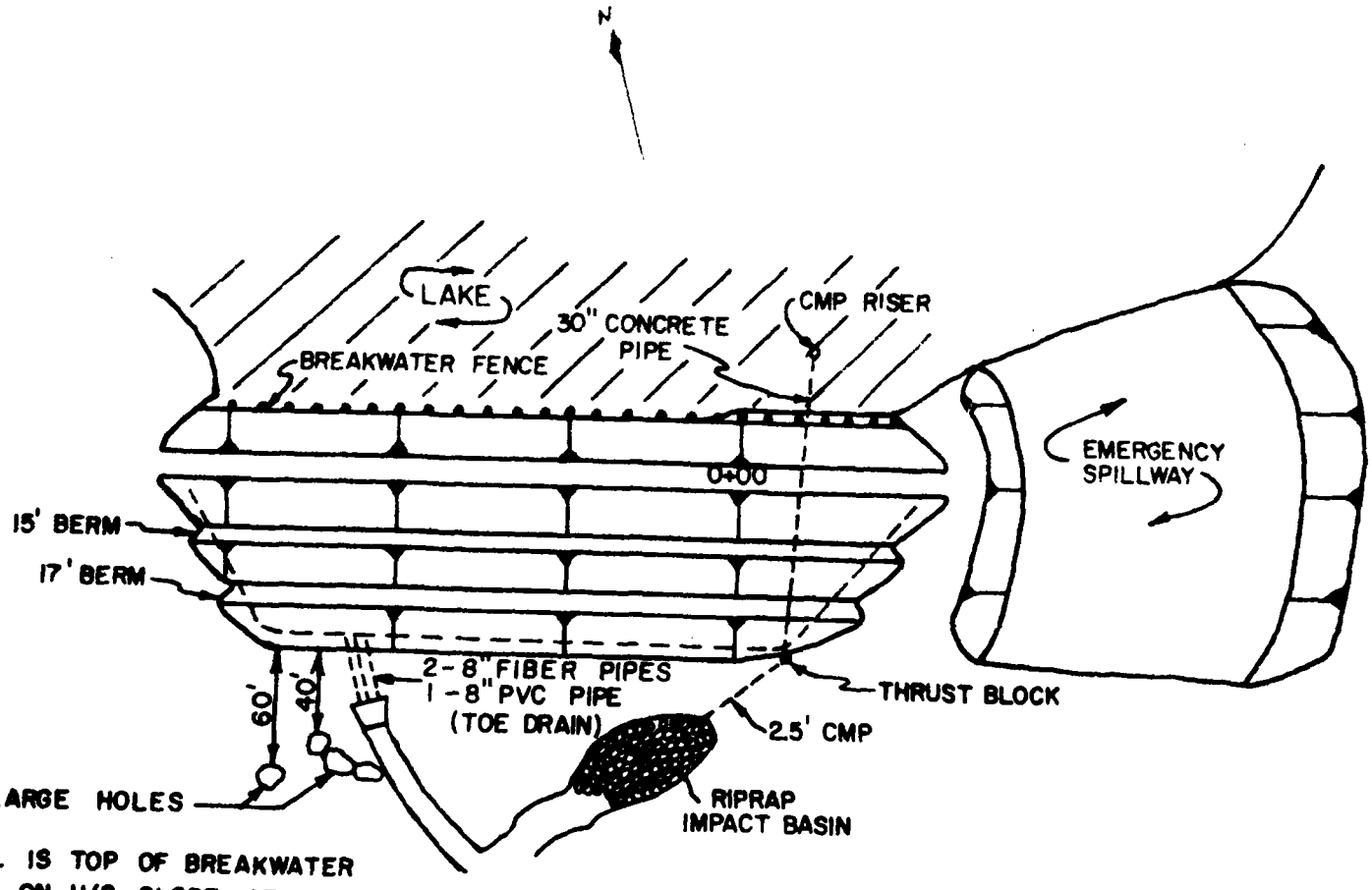
A.5.2 Persons in Probable Flood Path - 40-50 (approx.)

A.5.3 Downstream Property - Numerous family dwellings, church, and school located in the Lenox community.

A.5.4 Warning Systems - None

APPENDIX B

SKETCHES AND LOCATION MAPS

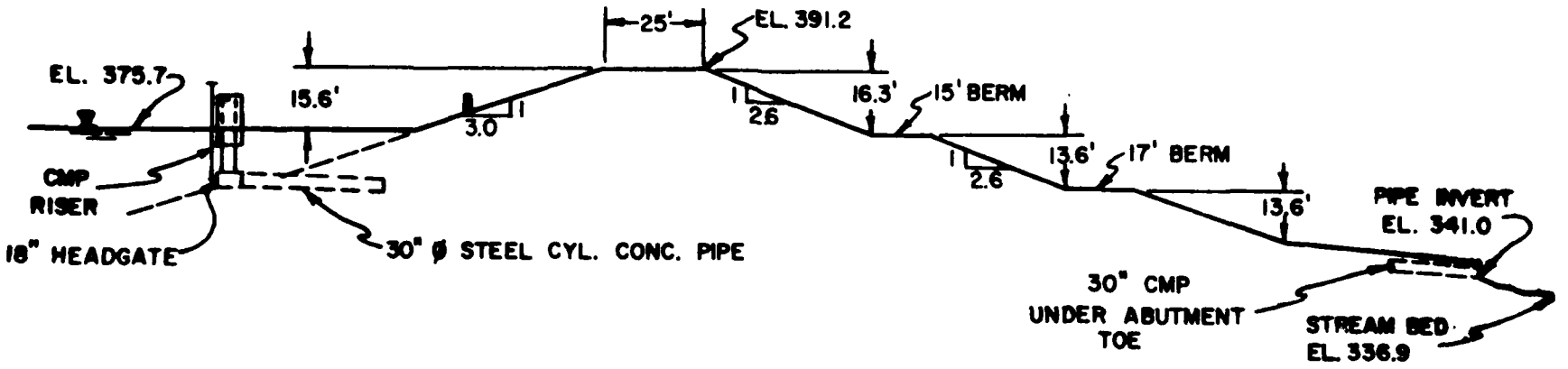


NOTE: T.B.M. IS TOP OF BREAKWATER POST ON U/S SLOPE AT STA. 0+00, ELEV 382.9. ELEVATIONS REF. FROM PIPE INVERT, ELEV. 341.0

GENERAL PLAN

N.T.S.

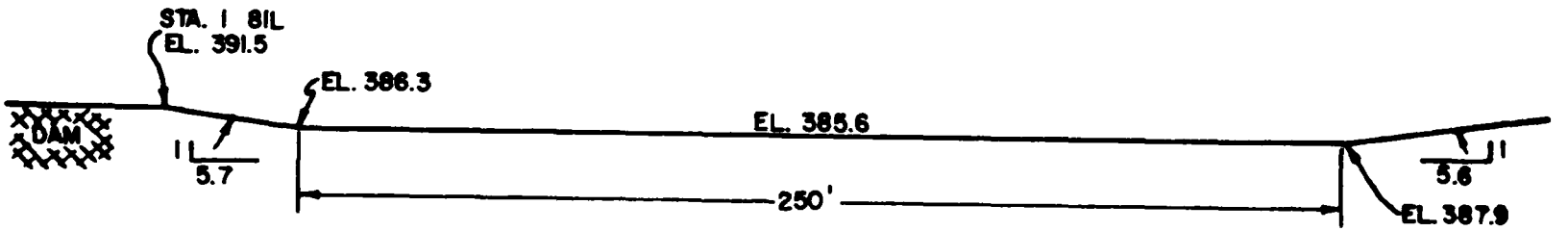
COON CREEK SITE 60-6
DRAWN BY: G.A.D.
DATE: 3/30/81
SHEET: 1 OF 8



NOTE: NORMAL POOL ELEV.
IS 380.0

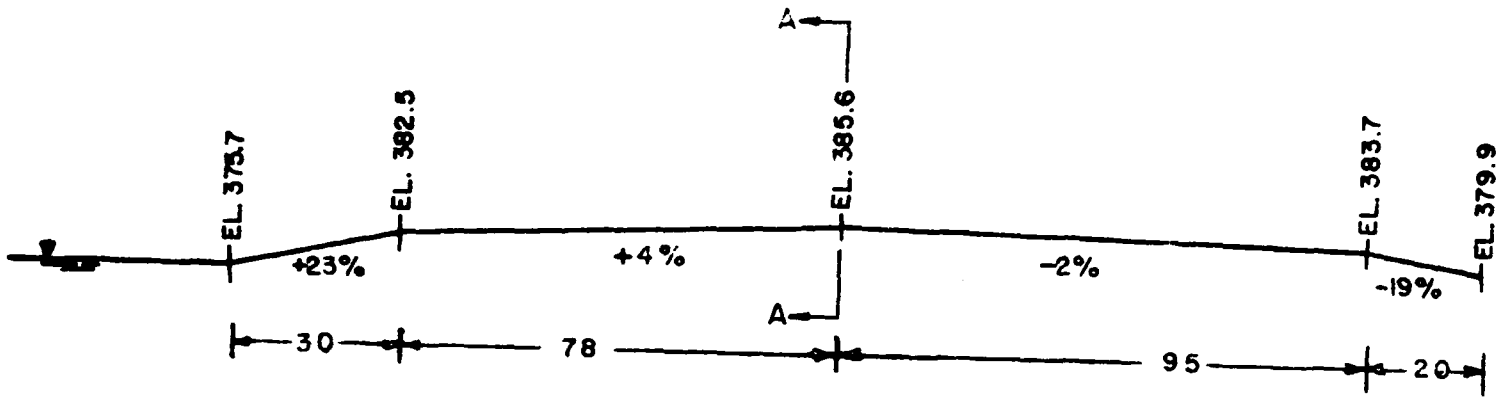
MAXIMUM SECTION @ STA. 1+20R
SCALE: 1" = 40'

COON CREEK SITE 60 6
DRAWN BY: G.A.D.
DATE: 4/7/81
SHEET: 2 OF 5



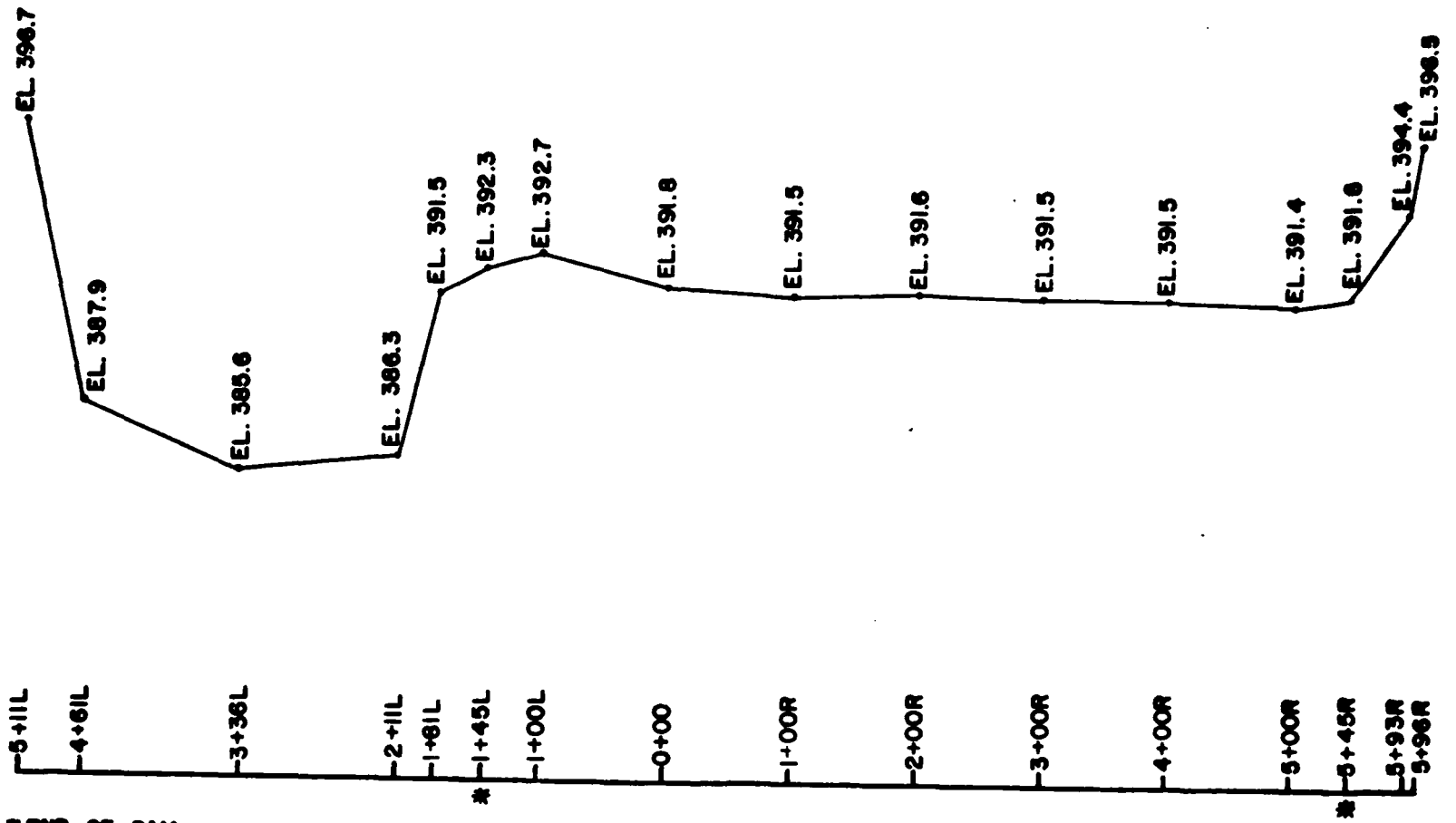
EMERGENCY SPILLWAY CONTROL SECTION
SCALE: 1" = 40'

COON CREEK SITE 60-6
DRAWN BY: G.A.D.
DATE: 3/30/81
SHEET: 3 OF 5



EMERGENCY SPILLWAY PROFILE
SCALE: 1" = 30'

COON CREEK SIT 60 6
DRAWN BY: G.A.D.
DATE: 3/30/81
SHEET: 4 OF 5



CREST ℄ PROFILE

H. SCALE: 1" = 125'
V. SCALE: 1" = 5'

COON CREEK SITE
80-6

DRAWN BY: G.A.D.

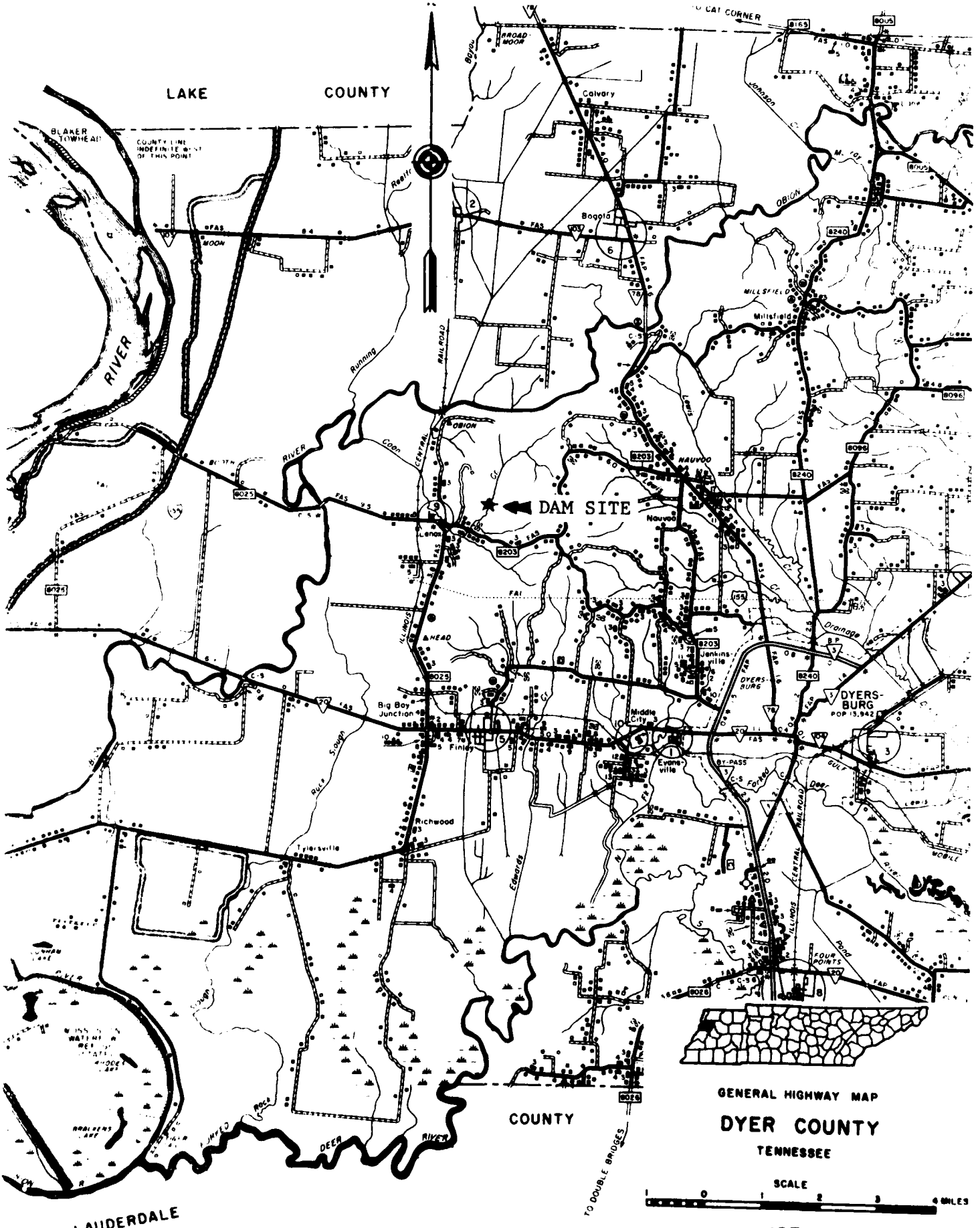
DATE: 3/30/81

SHEET: 5 OF 5

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SITE LOCATION MAP

From: U.S. Geological Survey
Dyersburg, Tennessee Quadrangle
Scale: 1" = 2,000'
Contour Interval: 10 feet


LAKE COUNTY
BLAKER TOWHEAD
COUNTY LINE INDEFINITE EAST OF THIS POINT
MOON
RIVER
Running
RAILROAD
OBION
Goon
CENTRAL
ILLINOIS
HEAD
DAM SITE
Lenox
NAUVOO
Nauvoo
Millsfield
Bogota
Calvary
Jenkins-ville
DYERS-BURG
DYERS-BURG POP 15,942
Drainage
Big Boy Junction
Finley
Middle City
Evans-ville
BY-PASS
Richwood
Tylersville
Gulf
Deer
Pond
FOUR POINTS
MOBILE
COUNTY
TO DOUBLE BRIDGES
DEER RIVER
AUDERDALE
GENERAL HIGHWAY MAP
DYER COUNTY
TENNESSEE
SCALE
0 1 2 3 4 MILES
1970

APPENDIX C

PHOTOGRAPHIC RECORD

Photographic Log

Photo No. 1 - View of the upstream slope and breakwater fence.

Photo No. 2 - Erosion along the breakwater fence.

Photo No. 3 - A large gully behind the breakwater fence. These gullies are numerous in this area.

Photo No. 4 - A gully or hole on the upstream slope measured to be about 5 feet deep.

Photo No. 5 - View of the downstream slope showing the concrete drainage ditches on the berm.

Photo No. 6 - An 8 foot deep hole on the back side of the crest at about Station 0+00.

Photo No. 7 - A large hole on the downstream slope near Station 0+00, believed to be a continuation of the hole shown in Photo No. 6.

Photo No. 8 - Fill material that has been deposited in the drainage channel below the hole shown in Photo No. 7.

Photo No. 9 - View of a large hole on the back side of the crest near the right end of the dam. The hole is several feet deep and is believed to be associated with several smaller holes that emerge on the downstream slope above the first berm.

Photo No. 10 - View of the 48" diameter anti-vortex baffle surrounding the principal spillway riser. The headgate stem is bolted to the riser.

Photo No. 11 - View of the principal spillway outlet pipe and riprap impact basin. The outlet pipe is a 30 inch diameter CMP with a flanged end section.

Photo No. 12 - View of the riprap drainage channel below the pipe outlet.

Photo No. 13 - View of the right bank in the drainage channel shown in Photo No. 12. The bank is saturated and has had some minor sloughing.

Photo No. 14 - View of the toe drain pipe outlets located about 50 feet downstream of the dam in the original creek channel. There has been some undermining of the concrete slab that supports the pipes.

Photo No. 15 - View of one of several large holes located about 75 feet downstream of the dam near the original creek channel. A small flow that originates from the west valley bank enters this particular hole and exits into the original creek channel.

Photo No. 16 - View of a large hole located about 100 feet downstream of the right toe.

Photo No. 17 - View of the emergency spillway channel looking upstream at the left abutment.

Photo No. 18 - View of a large gully located on the right downstream end of the emergency spillway channel.

Photo No. 19 - View of a large gully located on the left downstream end of the emergency spillway channel.

Photo No. 20 - View of the upper portion of the downstream slope where numerous holes associated with erosion of the fill material emerge.

Photo No. 21 - Overview of the dam and spillway from the left abutment.

Photo No. 22 - View of the lake area. The water level is about 4 feet below normal pool.

PHOTO NO. 1

PHOTO NO. 2

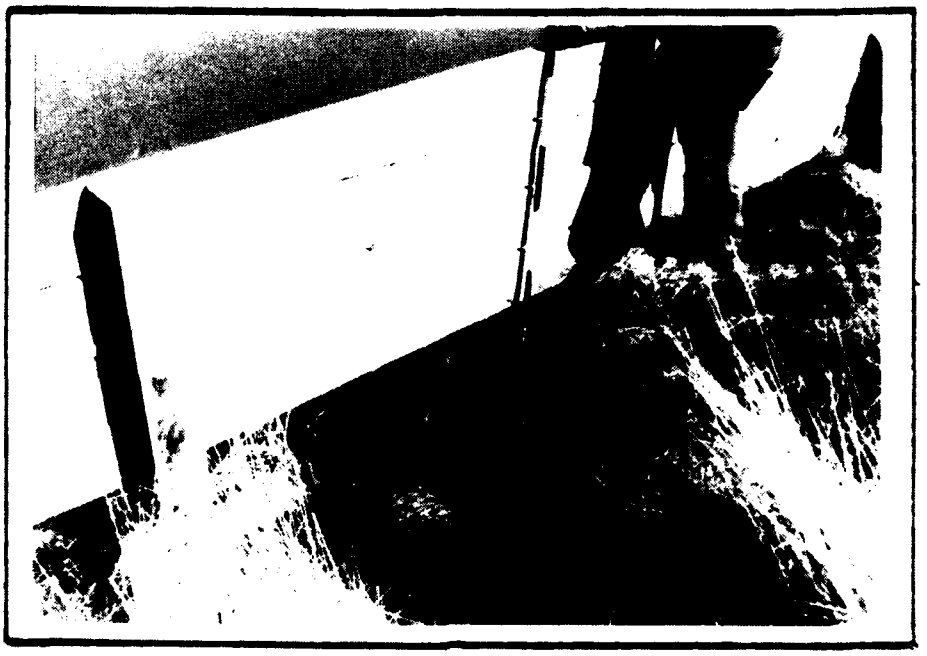


PHOTO NO. 3

PHOTO NO. 4

PHOTO NO. 5

PHOTO NO. 6

PHOTO NO. 7

PHOTO NO. 8

PHOTO NO. 9

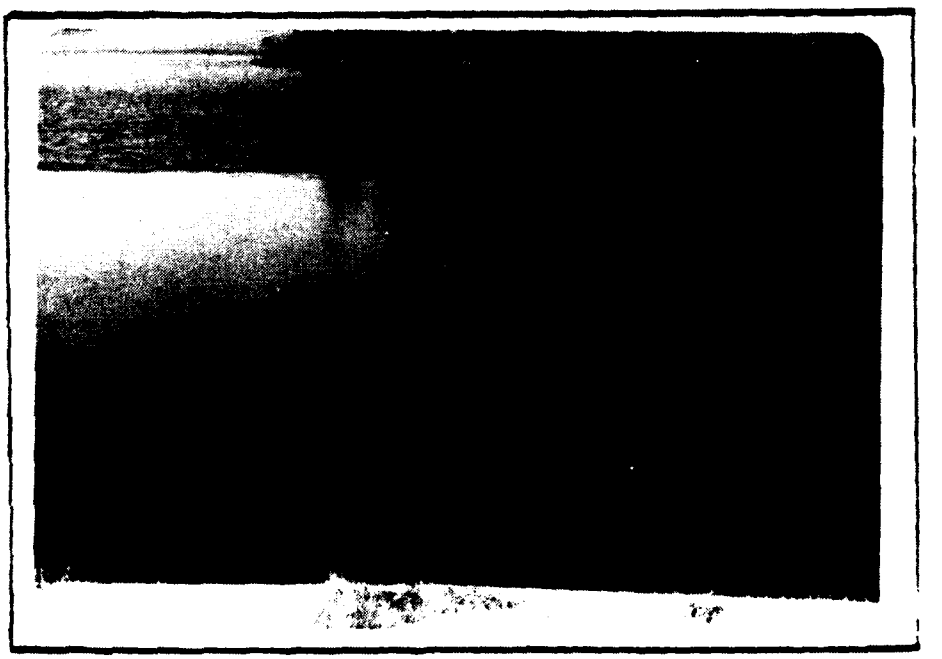


PHOTO NO. 10

PHOTO NO.11

PHOTO NO.12

PHOTO NO. 13

PHOTO NO. 14

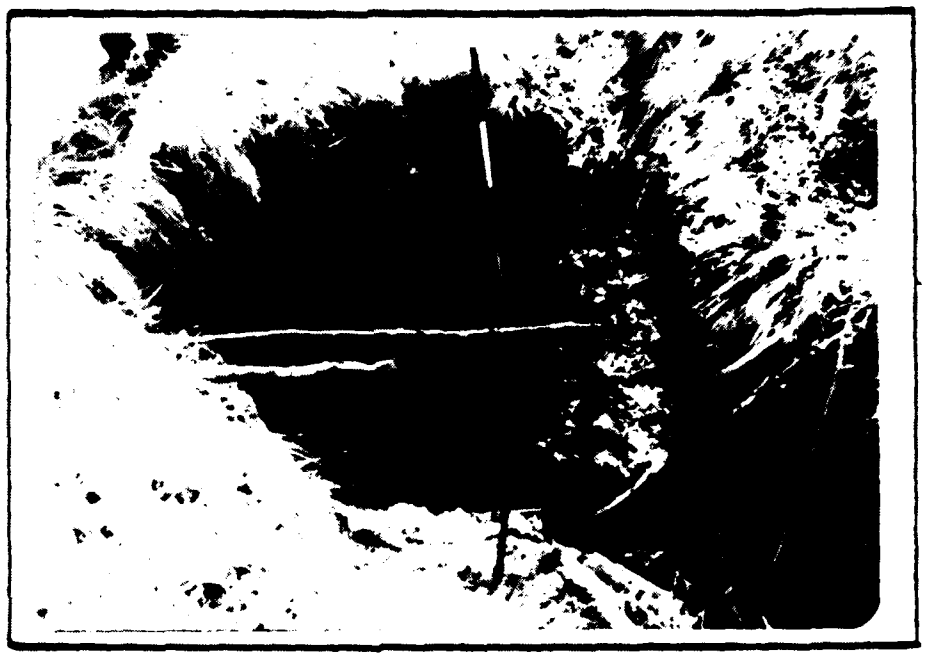


PHOTO NO. 15

PHOTO NO. 16

PHOTO NO. 17

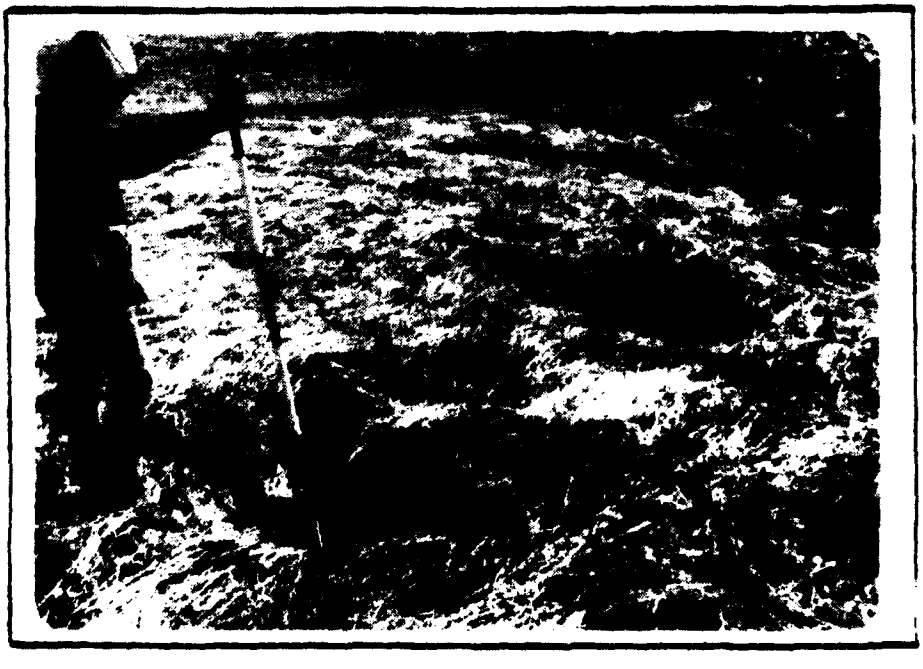


PHOTO NO. 18

PHOTO NO. 19

PHOTO NO. 20

PHOTO NO.21

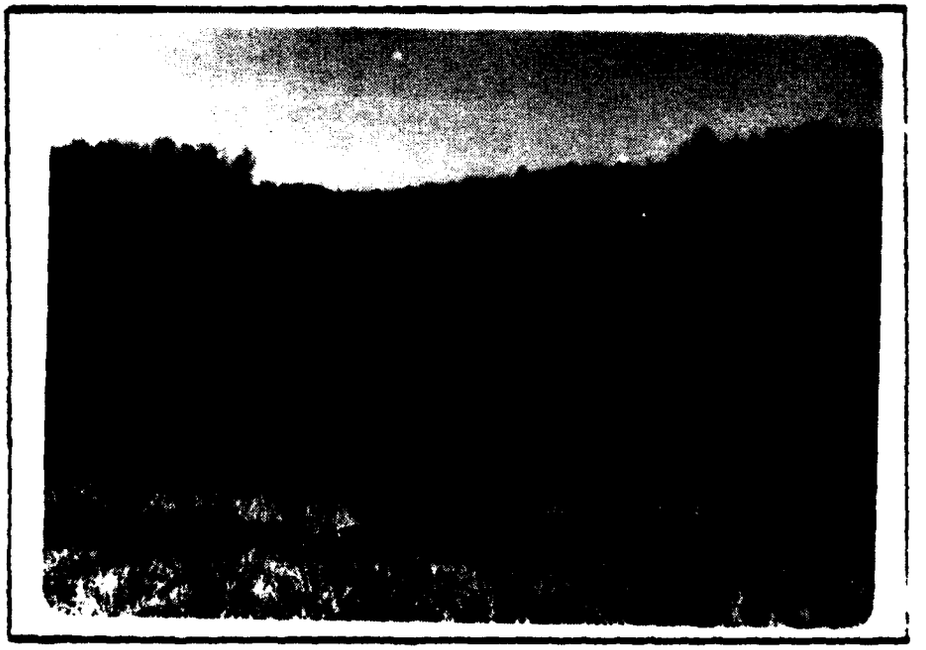


PHOTO NO.22

APPENDIX D

TECHNICAL CRITIQUES AND INSPECTION CHECKLIST

Check List
Visual Inspection of Earth Dams
Department of Conservation
Division of Water Resources

Name of Dam 60-6

County Dyer Date of Inspection 2-4-81

ID # - State _____ Federal TN 00508

Type of Dam Earth

Hazard Category-Federal High State 1

Weather Clear, windy Temperature 30° F

Pool at Time of Inspection 15 feet (distance from crest)

Tailwater at Time of Inspection 0 (distance from stream bed)

Design/As Built Drawings Available: Yes X No _____

Location: TDWR and OFDBA

Copy Obtained: Yes X No _____

Reviewed: Yes X No _____

Construction History Available: Yes X No _____

Location: OFDBA

Copy Obtained: Yes _____ No X

Reviewed: Yes _____ No X

Other Records and Reports Available: Yes X No _____

Location: OFDBA

Copy Obtained: Yes _____ No X

Reviewed: Yes _____ No X

Prior Incidents or Failures: Yes X No _____

Inspection Personnel and Affiliation:

Bob Ramsey - TDWR _____

George Moore - TDWR _____

Gene Davis - TDWR _____

Anthony Privet - TDWR _____

CN-0385

I. Embankment

A. Crest

Description (1st inspection) Uniform, medium fescue cover. Several erosion holes on back edge of crest.

1. Longitudinal Alignment Linear

2. Longitudinal Surface Cracks None

3. Transverse Surface Cracks None

4. General Condition of Surface Good condition except for the several holes.

5. Miscellaneous One 8' deep hole in line with pipe on back side of crest. Hole exits in numerous places on upper back slope. Believed to be erosion associated with dispersive soil. Several other smaller holes of same type. Soil deposited in concrete channel.

B. Upstream Slope

1. Undesirable Growth or Debris None

2. **Sloughing, Subsidence, or Depressions** Numerous erosion channels along upstream slope. Some 4-5' deep belived to be erosion. May be associated with disp. soils. Good fescue cover. Possibly that some were animal burrows.

3. **Slope Protection** Thick fescue. Wooden wave wall - soil eroded around wall.

a. **Condition of Riprap** N/A

b. **Durability of Individual Stones** N/A

c. **Adequacy of Slope Protection Against Waves and Runoff** Does not appear to be adequate against runoff.

d. **Gradation of Slope Protection - Localized Areas of Fine Material** N/A

4. **Surface Cracks** None

C. **Downstream Slope**

1. **Undesirable Growth or Debris** None

2. **Sloughing, Subsidence, or Depressions; Abnormal Bulges or Non-Uniformity** Several holes exit on downstream slope. Believed to be associated with disp. soil. Soil deposited in concrete drainage channels installed in 1979 to channel surface runoff and stop erosion.

3. **Surface Cracks on Face of Slope** None

4. **Surface Cracks or Evidence of Heaving at Embankment Toe** None

5. **Wet or Saturated Areas or Other Evidence of Seepage on Face of Slope; Evidence of "Piping" or "Boils"** None

6. **Drainage System** Operating properly. Flow only from right drain. Some undercutting of concrete slab below drains.

7. **Fill Contact with Outlet Structure** Good condition.

8. **Condition of Grass Slope Protection** Fair, thin in some areas.

D. Abutments

1. Erosion of Contact of Embankment with Abutment from Surface Water Runoff, Upstream or Downstream Not significant

2. Springs or Indications of Seepage Along Contact of Embankment with the Abutments

3. Springs or Indications of Seepage in Areas a Short Distance Downstream of Embankment - Abutment Tie-in Small spring or stream flows beyond toe from right abutment.

II. Area Downstream of Embankment, Including Channel

A. Localized Subsidence, Depressions, Sinkholes, Etc. ____

Several depressions 40-60 feet below dam at right end.

Flow from stem or spring in bottom of these holes.

B. Evidence of "Piping", "Boils", or "Seepage" Muddy

bank along principal spillway exit channel on dam side.

Some sloughing of soil. Other side is dry.

C. Unusual Presence of Lush Growth, such as Swamp Grass, etc. None

D. Unusual Muddy Water in Downstream Channel None

E. Sloughing or Erosion None

F. Surface Cracks or Evidence of Heaving Beyond Embankment Toe None

G. Stability of Channel Sideslopes Fair, some erosion

of exit channel slopes. No grass protection.

H. Condition of Channel Slope Protection

I. Adequacy of Slope Protection Against Waves, Currents, and Surface Runoff Fair

J. Miscellaneous

K. Condition of Relief Wells, Drains, and Other Appurtenances None

L. Unusual Increase or Decrease in Discharge from Relief Wells None

III. Instrumentation

A. Monumentation/Surveys Could not locate BM as indicated on plans.

B. Observation Wells N/A

C. Weirs N/A

D. Piezometers N/A

E. Other

IV. Spillways

A. Service Spillway (Service/Emergency Combination Yes __ No X)

1. Intake Structure Condition Submerged. Portion that could be seen was okay.

2. Outlet Structure Condition Good condition.

3. Pipe Condition Unknown. Outlet is in good condition.

4. Evidence of Leakage or Piping None

5. General Remarks

B. Emergency Spillway

1. General Condition Good condition. No evidence of significant flow. Medium grass cover.

2. Entrance Channel Large erosion gully.

3. Control Section No erosion. Good condition.

3. **Exit Channel** Some erosion gullies where spillway drops off left side.

4. **Vegetative/Woody Cover** Fescue cover.

5. **Other Observations**

V. Emergency Drawdown Facilities (if part of service spillway so state) Located at base of riser. Was not inspected.

Land owner has wheel.

Are Facilities Operable: Yes X No ____

Were Facilities Operated During Inspection: Yes ____ No X

Date Facilities Were Last Used 1979

VI. Reservoir

A. Slopes Moderate to steep from surrounding topography.

B. Sedimentation Unknown

C. Turbidity Low

VII. Drainage Area

Description (for hydrologic analysis) Mostly wooded.

A. Changes in Land Use There have been reports of a planned residential development around lake, but not definite.

VIII. Downstream Area (Stream)

A. Condition (obstructions, debris, etc.) None

B. Slopes Gradual

C. Approximate No. Homes, Population, and Distance D/S

Approximately 50 homes and/or small businesses 1-2 miles downstream along with two churches and one school. Approximately population - 150.

D. Other Hazards County roads.

IX. Miscellaneous

Incidents/Failures Drawn down to repair erosion in 1979.

Observed Geology of Area Loess material.

X. Conclusions

Dam is stable but has erosion problems. Spillway appears to be adequate. Appears to be a dispersive soil.

XI. Recommendations

Check for dispersive soil and repair eroded areas of embankment and spillway. Monitor dam closely for future erosion.

Robert Ramsey
Regional Engineer

Chief Engineer

APPENDIX E

REVIEW
OF
AVAILABLE DESIGN DRAWINGS
AND
CONSTRUCTION DOCUMENTS

November 30, 1976
Job No. G-258
Serial No. N-253

SPIGOLON ENGINEERING LABORATORIES INC.

Obion-Forked Deer Basin Authority
c/o Continental Engineering, Inc.
Suite 501, Directors Plaza
3035 Directors Row
Memphis, Tennessee 38131

REF: GEOTECHNICAL INVESTIGATION

LAKE and DAM 60-6, COON CREEK
OBION-FORKED DEER BASIN AUTHORITY
DYER COUNTY, TENNESSEE

Gentlemen:

In compliance with your request, we have performed a site investigation for the referenced project. The results of the investigation are enclosed. The reported data consist of logs of test borings, performed in accordance with the specified locations and depths and results of laboratory tests.

We appreciate the opportunity to work with you on this project and look forward to working with you again in the future.

Sincerely yours,
SPIGOLON ENGINEERING LABORATORIES, INC.

S. J. Spigolon, P. E.
President

SJS/db

3438 FONTAINE ROAD — MEMPHIS, TENNESSEE 38116 — PHONE (901) 396-0461

GEOTECHNICAL INVESTIGATION
LAKE and DAM 60-6, COON CREEK
OBION-FORKED DEER BASIN AUTHORITY
DYER COUNTY, TENNESSEE

INTRODUCTION

Purpose and Scope

An earth fill, water retention dam is proposed in the valley of Coon Creek in Dyer County, Tennessee. A foundation investigation was made, consisting of five test borings along the centerline of the proposed dam. Two additional borings were made in the proposed emergency spillway area to investigate borrow materials. This report presents the results of the investigation, and presents recommendations for embankment design and earth fill compaction.

Description of Project

The project site is located approximately five miles northwest of Dyersburg in Dyer County, Tennessee. The proposed earth dam will impound about 690 acre feet of water and drain an area of almost 1300 acres. At normal pool, the reservoir will cover 125 acres. The dam will be 46 feet high and, at normal pool, will contain 36 feet of water. Valley bottom elevation at the centerline of the dam is 344, normal pool elevation is 380, maximum pool elevation at 385 and crest of dam at elevation 390. The length of the dam along the centerline is about 300 feet at the valley bottom and 565 feet along the crest.

SITE INVESTIGATION

Field Investigation

Seven test borings were made at the project site during July 29 to August 6, 1976, at locations shown on the enclosed Boring Location Plan, Figure 1. Borings B-1 through B-5 were made along the proposed centerline of the dam, to depths ranging from 50 to 75 feet each. These were all Standard Penetration Test borings, as described below. Two additional borings were made in the proposed borrow pit, in the emergency spillway area, to a depth of 50 feet each using auger sampling only. Logs of the penetration test borings are attached.

Standard penetration tests (ASTM D-1586) were made at 2.5 feet intervals for the upper ten feet and every five feet thereafter. This test consists of driving a two-inch O D split barrel sampler a distance of 18 inches by means of 140-pound weight dropping 30 inches. The number of blows required to drive the sampler the final 12 inches is recorded as the standard penetration test N-value, which is an index of the stiffness of the soil.

The samples retrieved in the standard penetration tests were placed in moisture-tight containers, which were carefully sealed, and then returned to the laboratory. The samples were then tested for moisture content and the driller's field description of the soils was verified or modified as needed. These samples will be stored for a period of three months following completion of the borings and then discarded unless, in the meantime, other instructions are received. The samples will be available for inspection by prospective bidders for construction of the project.

Vane shear tests were made in the upper, silty cohesive soils of borings B-2 and B-3 in the valley bottom. These soils form the foundation for the dam. The tests were made in strict accordance with ASTM D2573, using a calibrated vane shear device. The vane shear "cohesion" is indicated on the logs of borings B-2-A and B-3-A. Because of difficulties with the gear drive mechanism of the device, the last three samples of boring B-3 could only reach 50 foot-pounds. The vane shear strength value was therefore in excess of 2500 pounds per square foot.

Laboratory Tests

Laboratory tests of the soil samples from this project were limited to the moisture content tests described above and classification tests of the three general soil types encountered above elevation 320 with one or more samples tested to be representative of each soil type. Results of the laboratory tests are shown on the enclosed Soil Classifcation Test Report forms attached.

The shear strength and compressibilty of the foundation soils were evaluated by the field vane shear as described above. The engineering properties of the compacted embankment materials from the east abutment area were estimated on the basis of past experience. No laboratory tests were made to verify these properties since conservative values were used in the recommended design given below.

SITE CONDITIONS

Description of Site

The project site is located on the Chickasaw Bluffs in Dyer County, Tennessee. It is in the valley of Coon Creek, about four miles north of Finley, eight miles northwest of Dyersburg, and 12 miles west of Newbern. This is an area of loessial uplands, heavily disected by erosion. The stream patterns have a dendritic pattern and the valleys are characterized by a U-shape with steep walls and flat valley bottoms.

Geological Setting

The near-surface soil profile along the uplands extending from the bluff line eastward consists generally of 50 to 100 feet of loess, a wind-deposited clayey silt or sandy silt, overlying zero to 30 feet of gravelly sand terrace deposits of Pleistocene age. These recent deposits lie unconformably on the surface of a massive clay deposit of the Jackson Formation. These clays extend downward for several hundred feet.

The silty soils forming the loess bluffs were deposited originally on the nearby Mississippi River flood plain where they were pick up by the wind and re-deposited on the uplands. The coarsest particles were generally deposited closest to the bluff and the finer particles farther to the east. Therefore, it would be expected that the silty soils would have very low plasticity and be easily eroded because of the fairly low clay content.

Centerline Soil Profile

The test boring data was used to develop a generalized soil profile for the centerline of proposed dam. This is shown on the enclosed Figure 2.

The test borings disclosed a soil profile which is in general agreement with the expected geology of the site. From the tops of the hills at the abutments, downward to elevation 350 to 360, the loess soil is a non-plastic silt, with a trace of clay. Below this, to about elevation 320, the loess is a clayey silt of low plasticity, having appreciably more clay than the upper material. Below elevation 320 in borings B-2, B-3, and B-4 the soil type is a very stiff to hard clay, probably the Jackson Formation, which is an impervious stratum. The soil profile also disclosed the fact that Coon Creek, in the geologic past, eroded a valley down to the surface of the Jackson Formation clay at elevation 320. Later, there was deposition of gravel sand, silt and clay in a heterogeneous mass. This valley fill

layer, which is about ten feet thick, was derived from erosion of various sites upstream. Even later, as the stream profile flattened the uppermost ten feet of the valley bottom consist of alluvial deposits of silt and clayey silt. These soils were derived from upstream erosion and from colluvial deposition by sheet erosion and slumping of the nearby valley walls. The uppermost valley bottom soils, therefore, have the same characteristics as the nearby hills.

The engineering properties of the clay stratum below elevation 320 were not considered to be of concern to this investigation beyond the establishment that these soils are hard and impervious. Previous experience with these soils indicate they are of medium to high plasticity. The granular layer between elevation 320 and 330 in the valley bottom is semipervious and is probably water bearing during the wet season of the year. The ten feet of silt forming the valley bottom and the silt soils in the abutments are relatively impervious. Even though the soils exhibit a low plasticity in the Atterberg Limit test, they do contain a significant amount of active clay. These soils tend, however, to derive their strength from partial saturation and, upon saturation, will lose a portion of their strength. In calculations for the stabilty of the dam, the probable loss of strength was taken into account.

EMBANKMENT DESIGN RECOMMENDATIONS

General Statement

The test borings and laboratory tests are indicative of soil conditions at the locations of the individual test borings. Although every effort has been made to interpret this data giving due consideration to the known geology of the area and to previous experience with soils in this area, no guarantee can be made or implied regarding the engineering properties or stratification of the soils between test boring locations.

Recommended Cross-Section

A recommended embankment design cross-section is shown on the enclosed Fig. 3. A modified-homogeneous section, composed entirely of compacted loessial fill, with a blanket toe drain, and without a cutoff trench, is dictated by (a) the character of the soils in the proposed emergency spillway excavation, and (b) the presence of a ten foot thick silt blanket in the valley bottom overlying a previous substratum. Assuming a 36 foot head and a conservative value for vertical permeability of the silt, the seepage loss at the deepest part of the reservoir by downward seepage through the silt will be on the order of 0.1 cubic feet per day per square foot of surface. A will be described later, this quantity can be decreased slighty

by compacting the upper surface of the upstream blanket of silt for several hundred feet upstream. If this is an unacceptable situation, then it will be necessary to create an impervious cutoff by excavating to a depth of about 20 feet below valley bottom. Since the pervious stratum is likely to carry water, the cutoff trench excavation will not only be deep but will require dewatering. It is this writer's opinion that this will be an extremely expensive design feature and should be avoided if at all possible.

Foundation preparation should consist of clearing and grubbing in the basin area and stripping of top soil in the embankment foundation area. Because of reliance on the full thickness of the cohesive silt layer as a seepage blanket it will be necessary for all stumps to be removed and the stump holes backfilled with compacted cohesive soils. The uppermost six inches of the embankment foundation and of the upstream blanket for a distance of at least 400 feet upstream should be scarified and compacted using the same equipment, methods, and specification requirements given below for compaction of the embankment soils. It is imperative that no greater undercutting be made in the valley bottom blanket than is absolutely necessary. This means that no key trench should be used.

It appears from the borrow pit borings in the area of the proposed emergency spillway that the soils are satisfactory for use in the embankment. All of the soils were loess, with varying degrees of plasticity. Therefore, a homogeneous cross-section is recommended, modified by the inclusion of a blanket toe drain. Considering the relative firmness of the foundation soils and of the expected shear strength of the compacted embankment, it is recommended that the embankment be design with upstream and downstream slopes of three horizontal to one vertical (3:1). It is recommended that one or more berms, ten feet wide or so, be provided upstream and downstream. The downstream berms will serve to collect surface rain water runoff to reduce surface erosion. The surface of the berms should be formed into a "half-moon" swale, solid sodded with a thick grass, to act as a drainage ditch. The upstream berm will act to provide additional weight on the toe of the slope to provide additional protection against a circular arc failure. The upstream berm should be placed in the lower one-third of the height of the dam. Since the dam is located in earthquake Zone #3, these additional precautions will assist in providing earthquake resistance to the dam. There are no restrictions on crest width. If a roadway is proposed to cross the surface of the dam, then the crest should be made sufficiently wide to accommodate the expected traffic.

A horizontal toe drain should be used to control the seepage through the dam and under the dam to prevent a piping failure. A three foot thick drain should be used, placed in a semi-compacted manner, from the toe of the dam to a distance equal to the height of the dam at any point plus five feet from the centerline of the dam. The blanket should extend from abutment to abutment and be continuous along the length of the dam. At the downstream toe, the exposed surface should be covered with about one foot of compacted cohesive materials to provide erosion protection. The drain material should communicate with a drain tile in a shallow trench at the toe and the drain pipe should empty downstream. To comply with the usual requirements for a pervious filter material capable of resisting piping action, it is recommended that standard concrete sand meeting the gradation requirements of ASTM C33

be used. The drain pipe should be covered with a suitable filter material such as pea gravel or be covered with a filter cloth to prevent infiltration of the sand into the pipe.

The existing ditch of Coon Creek should be cleaned out throughout the entire foundation area of the dam and for a distance of about 1000 feet upstream. The ditch should then be filled with embankment-type soils from the borrow pit and placed and ccompacted in accordance with the compacted fill requirements specified for the embankment itself. It is the intention of this requirement to eliminate any posibility of underseepage through the existing ditch.

Compacted Fill Requirement

The fill soils for the embankment, exculsive of the toe drain, will undoubtedly be composed of local clayey silt from the emergency spillway excavation. General project specification requirements regarding top soil, root matter, etc, should be observed in the selection of embankment soils from the borrow pit.

Because of the extreme sensitivity of this soil to moisture content variation during compaction, it may be necessary to provide for areas where drying or wetting, as needed, can be performed. The moisture content should be at or slightly above the laboratory-derived moisture content of the Proctor compaction test. The entire embankment, exclusive of the toe-drain, should be placed in nine-inch loose, horizontal layers, and rolled uniformly until a minimum of 95% Standard Proctor density is achieved. It is expected that a mechanical tamping roller, such as a sheepsfoot roller, must be used to achieve uniform densification throughout the lift thickness.

The use of hauling equipment such as scrapers or crawler tractors as compaction equipment is not considered satisfactory. This type of equipment should be permitted only after extensive field tests prove the capability of the equipment and of the contractor to provide uniform coverage and uniform densification.

The integrity of the compacted fill can only be assured if there is adequate inspection and testing. A qualified soils engineering technician should be present at all times during placement of compacted fill to observe uniform compaction, lift thickness, quantity and type of soil being placed, and other necessary observations. The frequency of field density tests should be as given in the project specifications. The soils engineering technician should have the capability of performing Proctor compaction tests quickly, either in the field or in the laboratory, so that changes in material type can be quickly evaluated for quality control purposes to prevent delay of the contractor.

This writer has reviewed the project specifications developed by Continental Engineering, Inc., and concurs with all of their provisions. For this reason, various recommendations regarding compacted fill are not presented here since they are adequately covered in the specifications.

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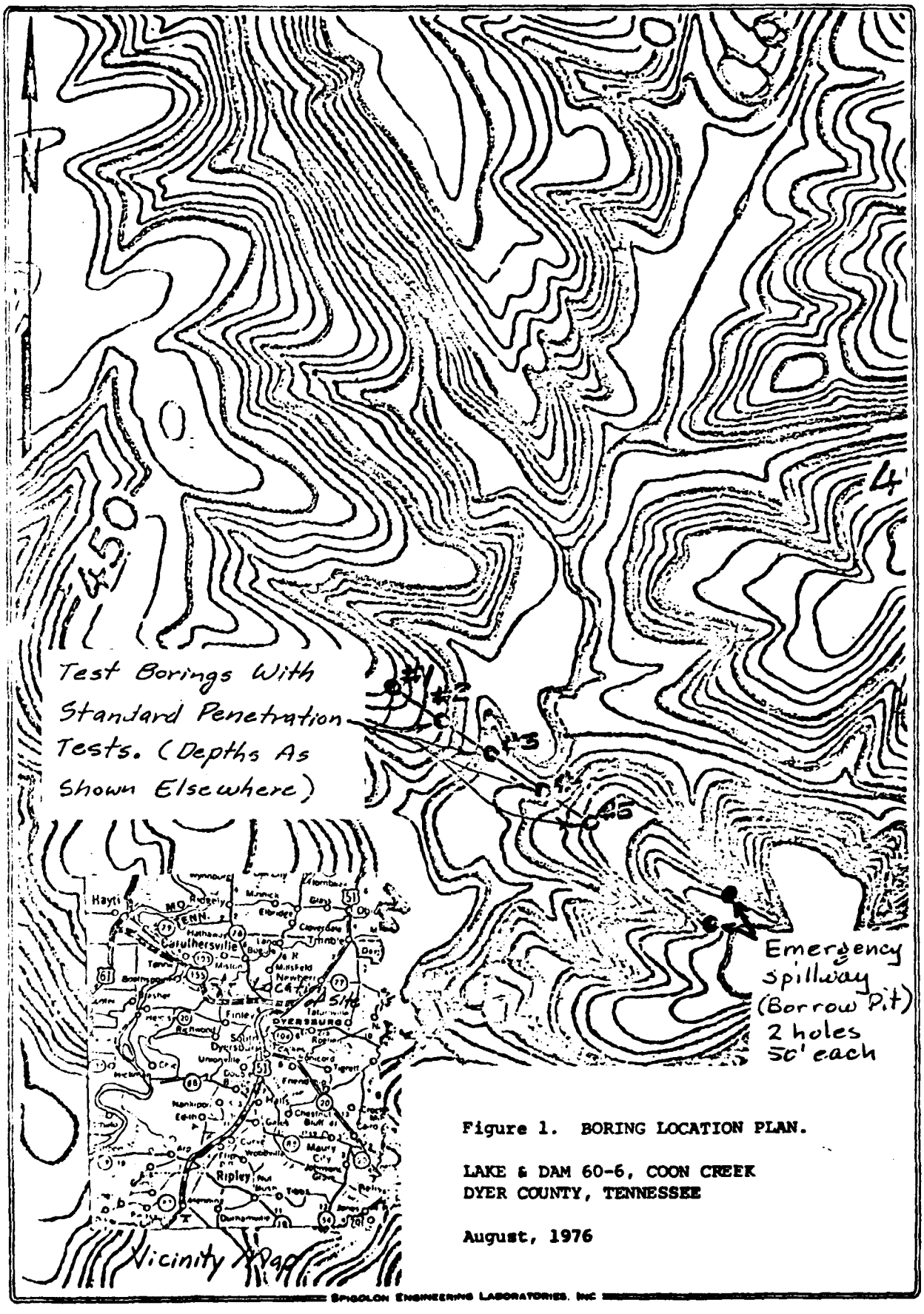


Figure 1. BORING LOCATION PLAN.

LAKE & DAM 60-6, COON CREEK
DYER COUNTY, TENNESSEE

August, 1976

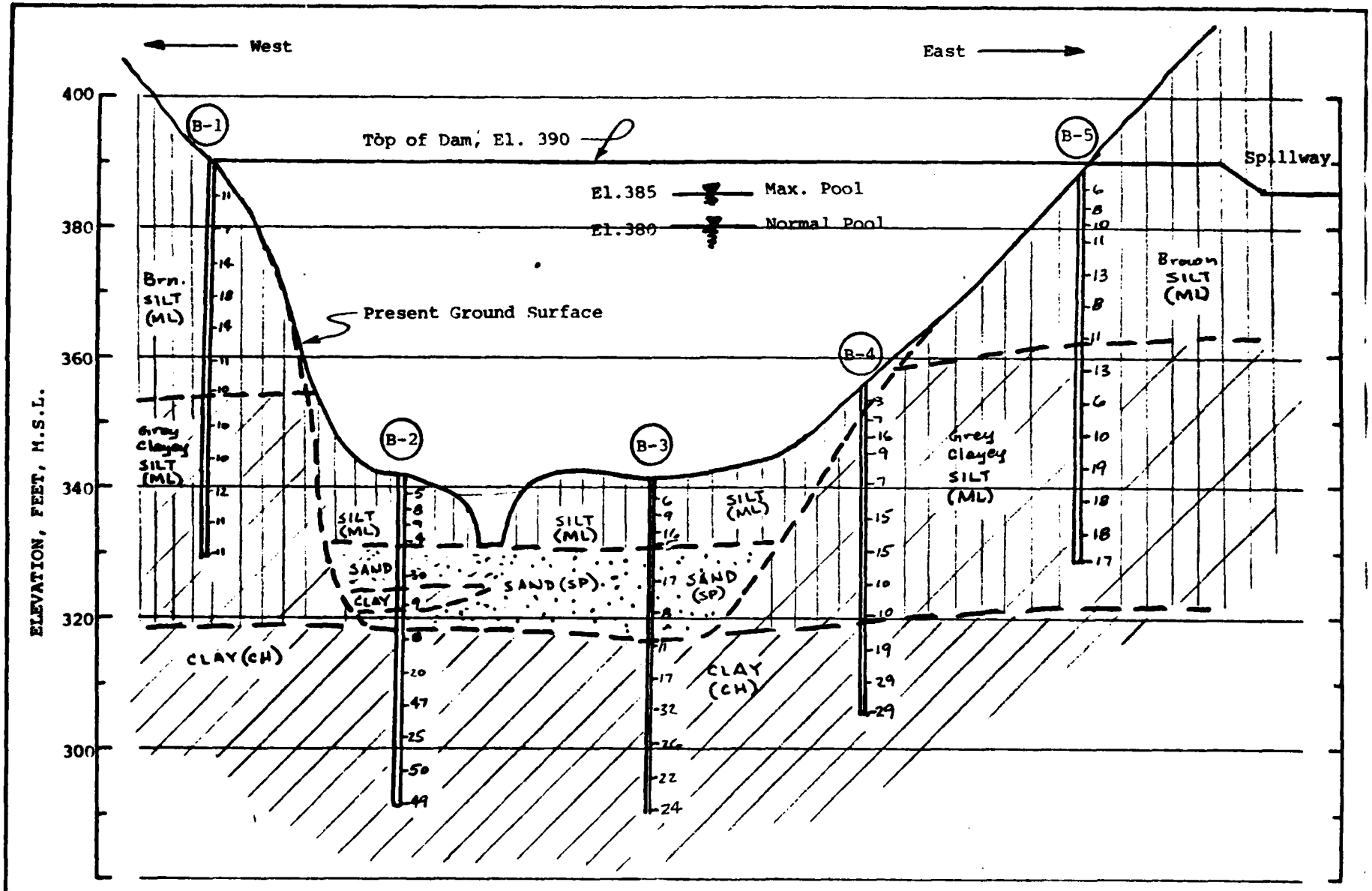


Figure 2, SOIL PROFILE

Legend: (Water Content) 23 — 16 (Std. Penetr. Test N-Value); (Tube Sample) — 3.2 (Unconf. Compr. Str., Ksf); (Water Level)

NOTE: Stratum boundaries shown between boring locations are for illustrative purposes only. No guarantee is made or implied regarding actual stratum boundaries.

E-86

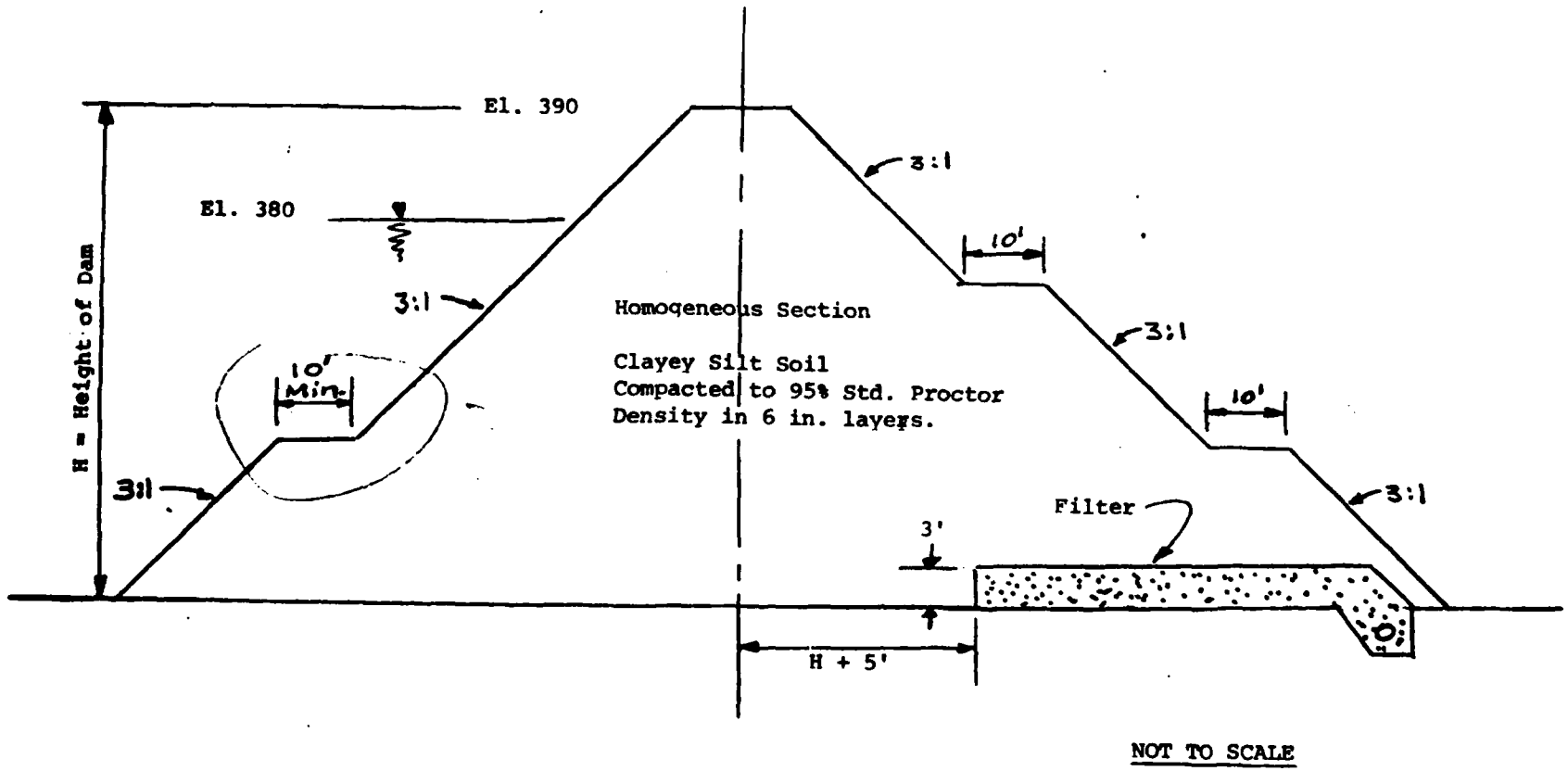


Figure 3. TYPICAL EMBANKMENT CROSS-SECTION.

LOG OF BORING

PROJECT
Lake and Dam 60-6, Coon Creek
Dyer County, Tennessee

JOB NO. G-258

BORING NO. 1
SHEET 1 OF 1

GROUND SURFACE ELEVATION 390'
DATUM M. S. L.

BORING LOCATION: Sta. 0+20, C.L. of Dam
West Abutment

BORING TYPE:
Hollow Stem Auger, 0-50'
Rotary w/Mud, 50-60'
Std. Penetration Tests

GROUND WATER LEVEL
None AT Drilling
AT
AT
AT

DATE 8-5-76
WEATHER
DRILLER J. Richardson
INSPECTOR T. Miller
BORING TERMINATED AT 60.0'

Stratum Depth Ft	Sample Depth Ft. From—To	Sample No.	Standard Penetration Test—N Blows/Ft	SAMPLE DESCRIPTION AND REMARKS	Water Content %	Hand Penetrometer TSF
	1.-2.5	1	4	Soft Brown SILT	25	1.25
	3.5-5.	2	11	Stiff Brown SILT	25	3.5
	6.-7.5	3	13	Stiff Brown SILT	21	2.75
	8.5-10.	4	7	Firm Brown SILT	21	1.25
	13.5-15.	5	14	Stiff Brown SILT	22	2.5
	18.5-20.	6	18	Very Stiff Brown SILT	18	1.0
	23.5-25.	7	14	Stiff Brown SILT	23	1.25
	28.5-30.	8	11	Stiff Brown SILT	22	1.0
	33.5-35.	9	10	Stiff Brown SILT	25	1.5
35'						
	38.5-40.	10	10	Stiff Gray Clayev SILT	25	0.5
	43.5-45.	11	10	Stiff Gray Clayey SILT	24	1.0
	48.5-50.	12	12	Stiff Gray Clayey SILT	26	1.5
	53.5-55.	13	11	Stiff Gray Clayey SILT	25	1.5
	58.5-60.	14	11	Stiff Gray Clayey SILT	26	2.5

SPIGOLON ENGINEERING LABORATORIES, INC.

LOG OF BORING

PROJECT: Lake and Dam 60-6, Coon Creek
Dyer County, Tennessee

JOB NO. G-258

BORING NO. 2
SHEET 1 OF 1

GROUND SURFACE ELEVATION 342'
DATUM M. S. L.

BORING LOCATION: Sta. 1+70, C.L. of Dam
West Valley Bottom

BORING TYPE:
Hollow Stem Auger
Std. Penetration Tests

GROUND WATER LEVEL
None Drilling
AT
AT
AT
AT

DATE 8-5-76
WEATHER
DRILLER J. Richardson
INSPECTOR T. Miller
BORING TERMINATED AT 50.0'

Stratum Depth, Ft	Sample Depth Ft From—To	Sample No	Standard Penetration Test—N Blows/Ft	SAMPLE DESCRIPTION AND REMARKS	Water Content %	Hand Penetrometer TSF	
	1.-2.5	1	5	Firm Brown SILT			
	3.5-5.	2	8	Firm Brown SILT			
	6.-7.5	3	9	Stiff Brown SILT			
7.5'							
	8.5-10.	4	4	Soft Brown Clayey SILT			
10'							
	13.5-15.	5	30	Very Firm Gray Fine SAND with Gravel			
	18.5-20.	6	9	Stiff Gray Sandy CLAY			
20'							
				Sandy GRAVEL			
23'							
	23.5-25.	7	8	Firm Green CLAY			
	28.5-30.	8	20	Very Stiff Green CLAY			
	33.5-35.	9	47	Hard Green CLAY			
	38.5-40.	10	25	Hard Green CLAY			
	43.5-45.	11	50	Hard Green CLAY			
	48.5-50.	12	49	Hard Green CLAY			

LOG OF BORING

PROJECT	JOB NO.	BORING NO. 2A
Lake and Dam 60-6, Coon Creek Dyer County, Tennessee	G-258	SHEET 1 OF 1

GROUND SURFACE ELEVATION 342 DATUM M.S.L.	BORING LOCATION: Sta. 1+70, C. L. of Dam West Valley Bottom

BORING TYPE:	GROUND WATER LEVEL	
4" Flight Auger 2.5" Shear Vane	None AT Drilling AT AT AT	DATE 8-5-76 WEATHER DRILLER J. Richardson INSPECTOR T. Miller BORING TERMINATED AT 10'

Stratum Depth, Ft	Sample Depth Ft From—To	Sample No.	Standard Penetration Test—N Blows/Ft.	SAMPLE DESCRIPTION AND REMARKS	Water Content %	Hand Penetrometer TSF
				Vane Shear tests made in auxiliary hole drilled 3 ft. from B-2. Rotation of vane at 6° per min. per ASTM D2573.		
				Torque, in-lbs. / Shear Str. psf		
	2.0'	V-1		720 / 2920		
	4.5'	V-2		840 / 3410		
	7.0'	V-3		1320 / 5360		
	9.5'	V-4		1440 / 5850		

SPIGOLON ENGINEERING LABORATORIES, INC.

LOG OF BORING

PROJECT	JOB NO.	BORING NO.
Lake and Dam 60-6, Coon Creek Dyer County, Tennessee	G-258	3 SHEET 1 OF 1

GROUND SURFACE ELEVATION 342'	BORING LOCATION: Sta. 3+ 60, C. L. of Dam
DATUM M. S. L.	East Valley Bottom

BORING TYPE:	GROUND WATER LEVEL	
Hollow Stem Auger Std. Penetration Tests	None AT Drilling AT AT AT	DATE 8-5-76 WEATHER DRILLER J. Richardson INSPECTOR T. Miller BORING TERMINATED AT 50.0'

Stratum Depth Ft	Sample Depth Ft From—To	Sample No	Standard Penetration Test—N Blows/Ft	SAMPLE DESCRIPTION AND REMARKS	Water Content %	Hand Penetrometer TSF
	1.-2.5	1	6	Firm Brown SILT	22	1.5
	3.5-5.	2	9	Stiff Brown SILT	25	.75
	6.-7.5	3	16	Very Stiff Brown SILT	25	1.25
7.5'						
	8.5-10.	4	5	Firm Gray SILT with Wood Fragments	24	1.75
10.'						
	13.5-15.	5	17	Very Stiff Gray SILT, CLAY and GRAVEL	17	--
	18.5-20.	6	8	Firm Gray SILT and GRAVEL with Wood Fragments	17	3.25
	23.5-25.	7	11	Stiff SILT, CLAY and GRAVEL	19	--
25.'						
	28.5-30.	8	17	Very Stiff Greenish White CLAY with a Trace of Silt	40	--
	33.5-35.	9	32	Hard Green CLAY with a Trace of Silt	28	>5.
	38.5-40.	10	26	Very Stiff Greenish White and Tan CLAY With a Trace of Silt	27	>5.
	43.5-45.	11	22	Very Stiff Greenish Brown CLAY with a Trace of Silt	27	>5.
	48.5-50.	12	24	Very Stiff Greenish Brown CLAY With a Trace of Silt	25	>5.

SPIGOLON ENGINEERING LABORATORIES, INC.

LOG OF BORING

PROJECT	JOB NO.	BORING NO. 3-A
Lake and Dam 60-6, Coon Creek Dyer County, Tennessee	G-258	SHEET 1 OF 1

GROUND SURFACE ELEVATION 342'	BORING LOCATION: Sta. 3+60, C. L. of Dam,
DATUM M. S. L.	East Valley Bottom

BORING TYPE:	GROUND WATER LEVEL	
4" Flight Auger 2.5" Shear Vane	None AT Drilling AT AT AT	DATE 8-5-76 WEATHER DRILLER J. Richardson INSPECTOR T. Miller BORING TERMINATED AT 15'

Stratum Depth, Ft	Sample Depth Ft From—To	Sample No.	Standard Penetration Test—N Blows/Ft	SAMPLE DESCRIPTION AND REMARKS	Water Content %	Hand Penetrometer TSF
				Vane Shear tests made in auxiliary hole drilled 3 ft. from B-3. Rotation of vane at 6° per min. per ASTM D2573.		
				Torque, in-lbs. / Shear Str. psf		
	2.0'	V-1		550 / 2230		
	4.5'	V-2		575 / 2330		
	7.0'	V-3	*	> 600 / > 2500		
	9.5'	V-4	*	> 600 / > 2500		

* Note: Problems with gear system of vane shear device prevented higher loads.

SPIGOLON ENGINEERING LABORATORIES, INC.

LOG OF BORING

PROJECT	JOB NO.	BORING NO. 4
Lake and Dam 60-6, Coon Creek Dyer County, Tennessee	G-258	SHEET 1 OF 1

GROUND SURFACE ELEVATION 357'	BORING LOCATION: Sta. 5 + 22, C. L. of Dam
DATUM M. S. L.	East Slope

BORING TYPE:	GROUND WATER LEVEL	
Hollow Stem Auger Std. Penetration Tests	None AT Drilling AT AT AT	DATE 8-5-76 WEATHER DRILLER J. Richardson INSPECTOR T. Miller BORING TERMINATED AT 50.0'

Stratum Depth Ft	Sample Depth Ft From—To	Sample No.	Standard Penetration Test—N Blows/Ft	SAMPLE DESCRIPTION AND REMARKS	Water Content %	Hand Penetrometer TSF
	1.-2.5.	1	3	Soft Brown SILT	26	1.5
	3.5-5.	2	7	Firm Brown SILT	26	2.25
	6.-7.5	3	16	Very Stiff Brown Clayev SILT	25	2.25
	8.5-10.	4	9	Stiff Brown Clayey SILT	25	1.0
10'						
	13.5-15.	5	7	Firm Brown and Gray Clayey SILT	28	-
	18.5-20.	6	15	Stiff Gray SILT	27	-
	23.5-25.	7	15	Stiff Gray SILT	26	-
	28.5-30.	8	10	Stiff Gray SILT	25	1.75
	33.5-35.	9	10	Stiff Gray Clayey SILT	24	2.75
35'						
	38.5-40.	10	19	Very Stiff White Clay	39	1.5
	43.5-45.	11	29	Very Stiff White Clay	36	2.25
	48.5-50.	12	29	Very Stiff White Clay	36	3.0

SPIGOLON ENGINEERING LABORATORIES, INC.

LOG OF BORING

PROJECT	JOB NO.	BORING NO. 5
Lake and Dam 60-6, Coon Creek Dyer County, Tennessee	G-258	SHEET 1 OF 1

GROUND SURFACE ELEVATION 390'
DATUM M.S.L.

BORING LOCATION: Sta. 6+85, C. L. of Dam
East Abutment

BORING TYPE:
Hollow Stem Auger, 0-50'
Rotary w/Mud, 50'-60'
Std. Penetration Tests

GROUND WATER LEVEL
None AT Drilling
AT
AT
AT

DATE 8-5-76
WEATHER
DRILLER J. Richardson
INSPECTOR T. Miller
BORING TERMINATED AT 60.0'

Stratum Depth Ft	Sample Depth Ft From—To	Sample No	Standard Penetration Test—N Blows/Ft.	SAMPLE DESCRIPTION AND REMARKS	Water Content %	Hand Penetrometer TSF
	1.-2.5	1	6	Firm Brown SILT	25	2.25
	3.5-5.	2	8	Firm Brown SILT	21	1.75
	6.-7.5	3	10	Stiff Brown SILT	15	1.25
	8.5-10.	4	11	Stiff Brown SILT	21	1.00
	13.5-15.	5	13	Stiff Brown SILT	24	1.25
	18.5-20.	6	8	Firm Brown SILT	24	1.00
	23.5-25.	7	11	Stiff Brown SILT	28	1.00
25'						
	28.5-30.	8	13	Stiff Gray CLAYEY SILT	23	1.25
	33.5-35.	9	6	Firm Gray Clayey SILT	26	2.00
	38.5-40.	10	10	Stiff Gray Clayey SILT	24	1.25
	43.5-45.	11	19	Very Stiff Gray Clayey SILT	27	1.25
	48.5-50.	12	18	Very Stiff Gray Clayey SILT	21	2.50
	53.5-55.	13	18	Very Stiff Gray Clayey SILT	23	1.75
	58.5-60.	14	17	Very Stiff Gray Clayey SILT	21	2.50

STIGOLON ENGINEERING LABORATORIES INC.

3438 FONTAINE ROAD — MEMPHIS TENNESSEE 38116 — PHONE (901) 396-0461

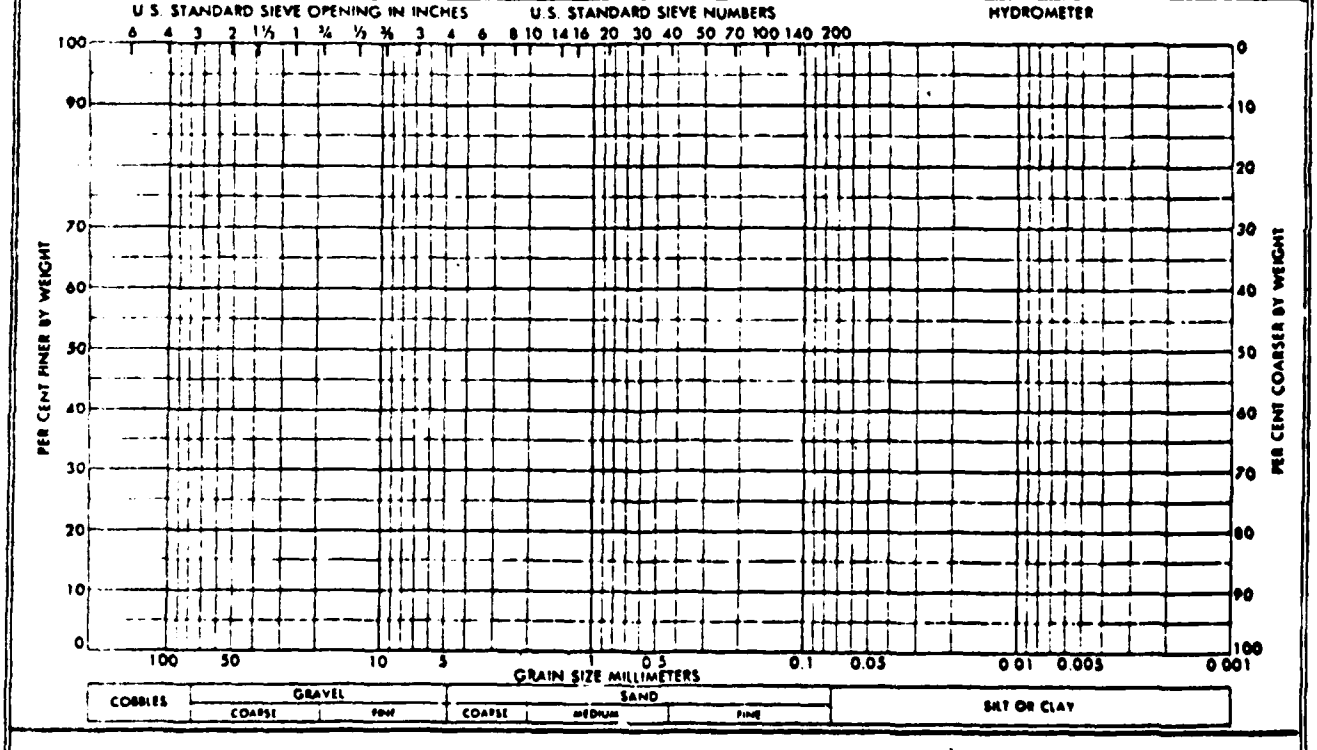
SOIL CLASSIFICATION TEST REPORT

Job No. G-258

Soil Type A Soil Description Brown Silt

Classification: UNIFIED ML AASHO _____ Other _____

Plotting Symbol	Boring No.	Sample No.	Elev. or Depth, ft	Nat. W%	Liquid Limit	Plastic Limit	Plast. Index	%-200 (Wash)	
	3	3	6.0-7.5	25	NP	NP	NP		
	4	4	8.5-10.0	25	NP	NP	NP		



Samples above represent, as a group, the following locations in the test borings:-

Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.
1	0-35'						
2	0-7.5'						
3	0-7.5'						
4	0-10'						
5	0-25'						

SPIGOLON ENGINEERING LABORATORIES INC.

3438 FONTAINE ROAD — MEMPHIS TENNESSEE 38116 — PHONE (901) 396-0461

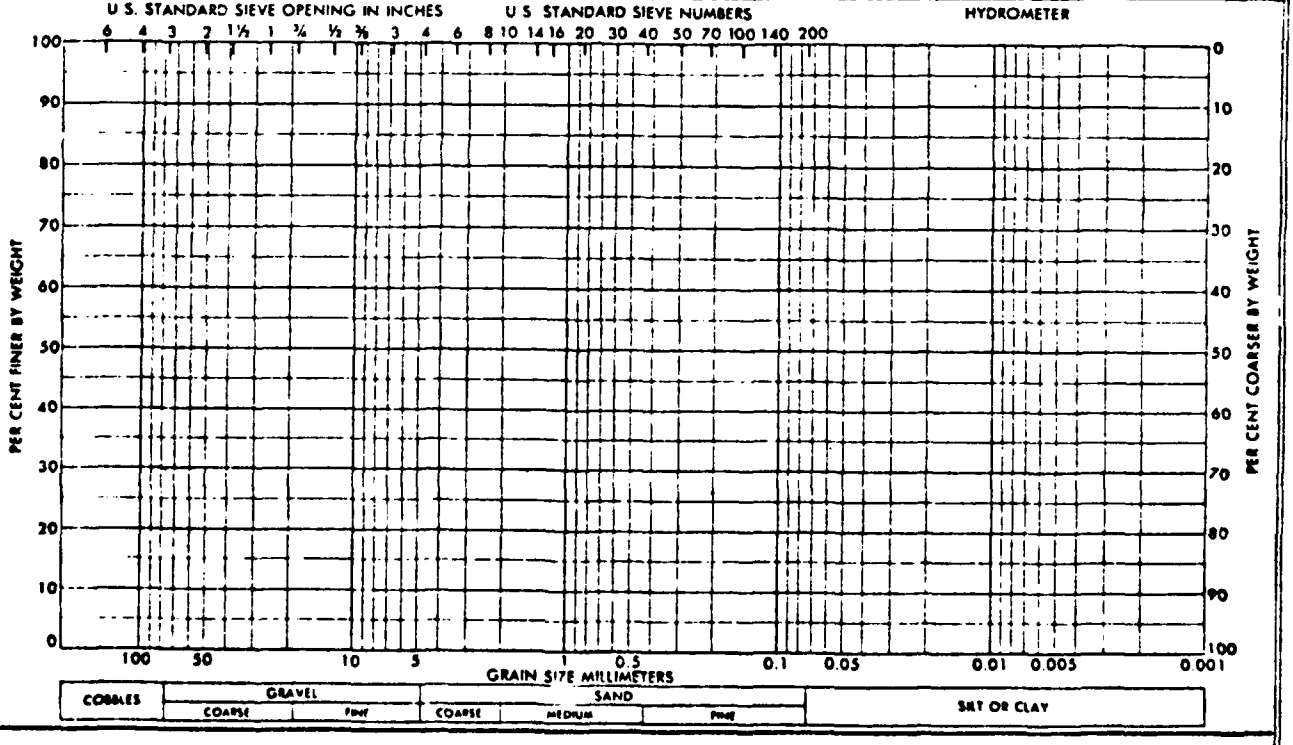
SOIL CLASSIFICATION TEST REPORT

Job No. G-258

Soil Type B Soil Description Gray Clayey Silt

Classification: UNIFIED ML-CL AASHO _____ Other _____

Plotting Symbol	Boring No.	Sample No.	Elev. or Depth, ft	Nat. W%	Liquid Limit	Plastic Limit	Plast. Index	%-200 (Wash)	
	1	10	38.5-40.	25	30	22	8		



Samples above represent, as a group, the following locations in the test borings:-

Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.
1	35'-60'						
2	7.5'-10'						
3	7.5'-10'						
4	10'-35'						
5	25'-60'						

SPIGOLON ENGINEERING LABORATORIES INC.

3438 FONTAINE ROAD — MEMPHIS TENNESSEE 38116 — PHONE (901) 396-0461

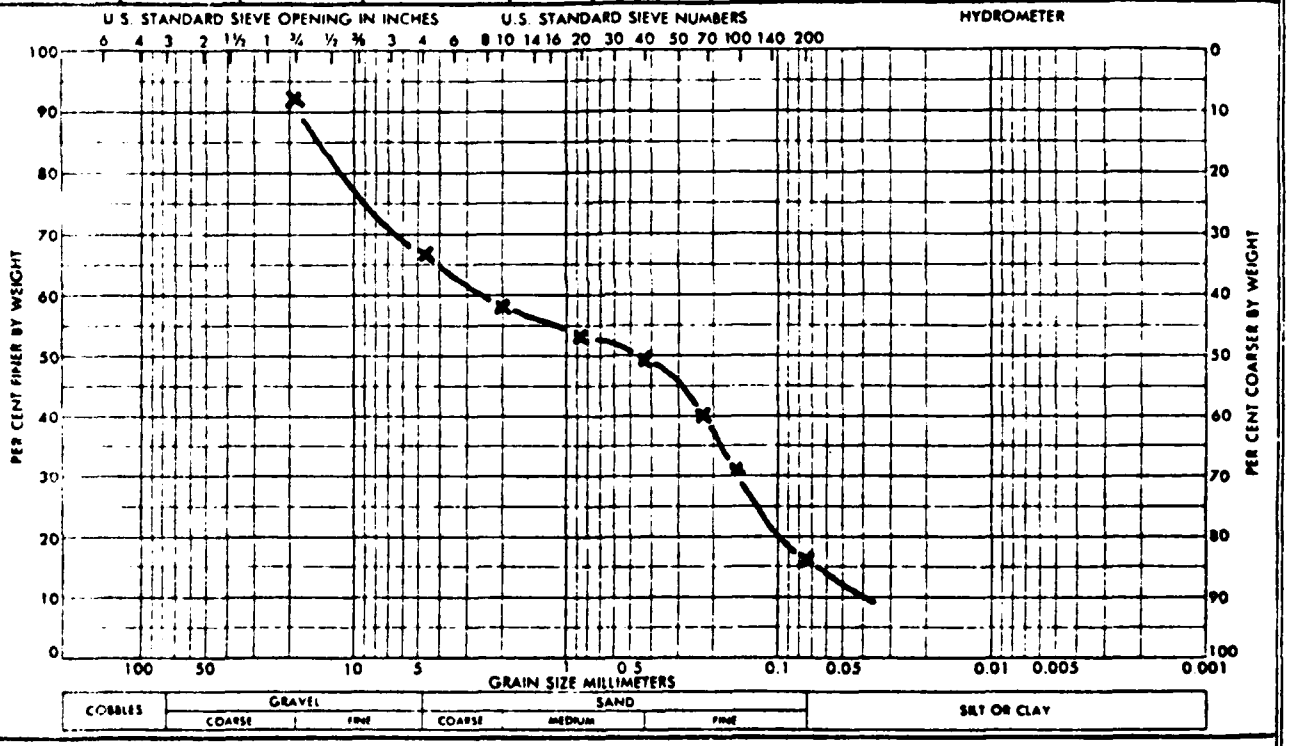
SOIL CLASSIFICATION TEST REPORT

Job No. G-258

Soil Type C Soil Description Poorly Graded Gravelly Sand

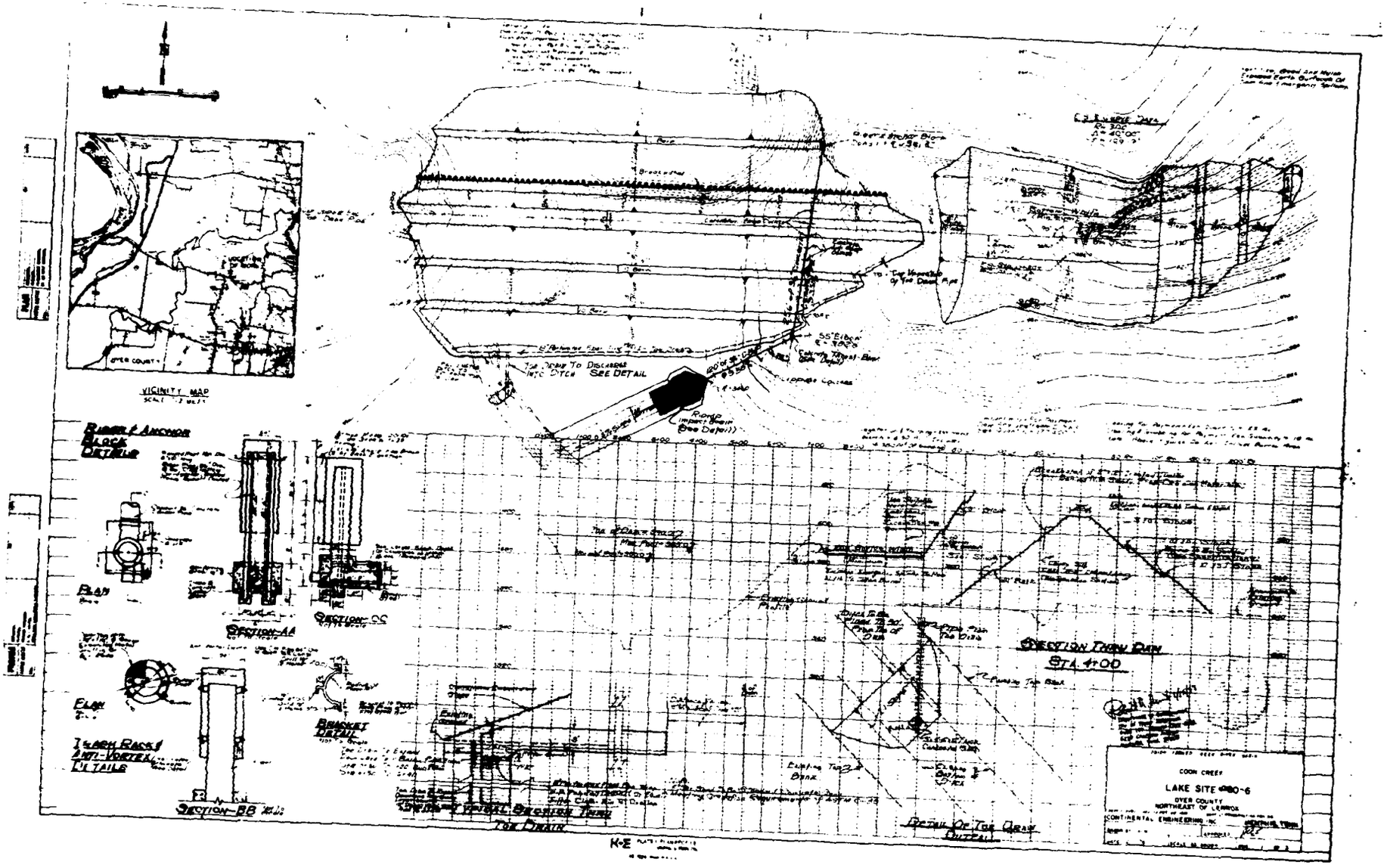
Classification: UNIFIED SP AASHO _____ Other _____

Plotting Symbol	Boring No.	Sample No.	Elev. or Depth, ft	Nat. W%	Liquid Limit	Plastic Limit	Plast. Index	%-200 (Wash)	
-x-	3	5	13.5-15.0	17	NP	NP	NP		

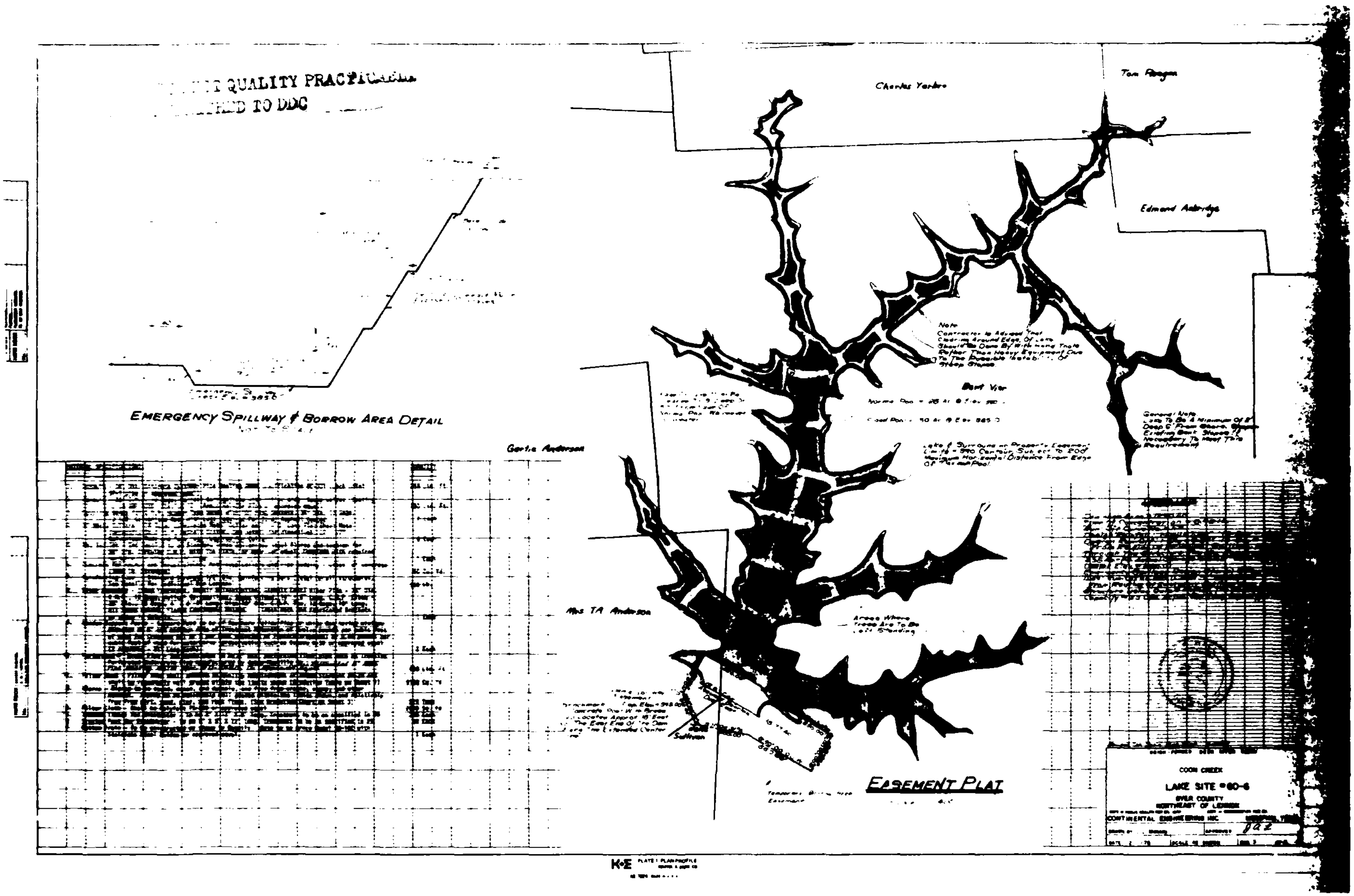


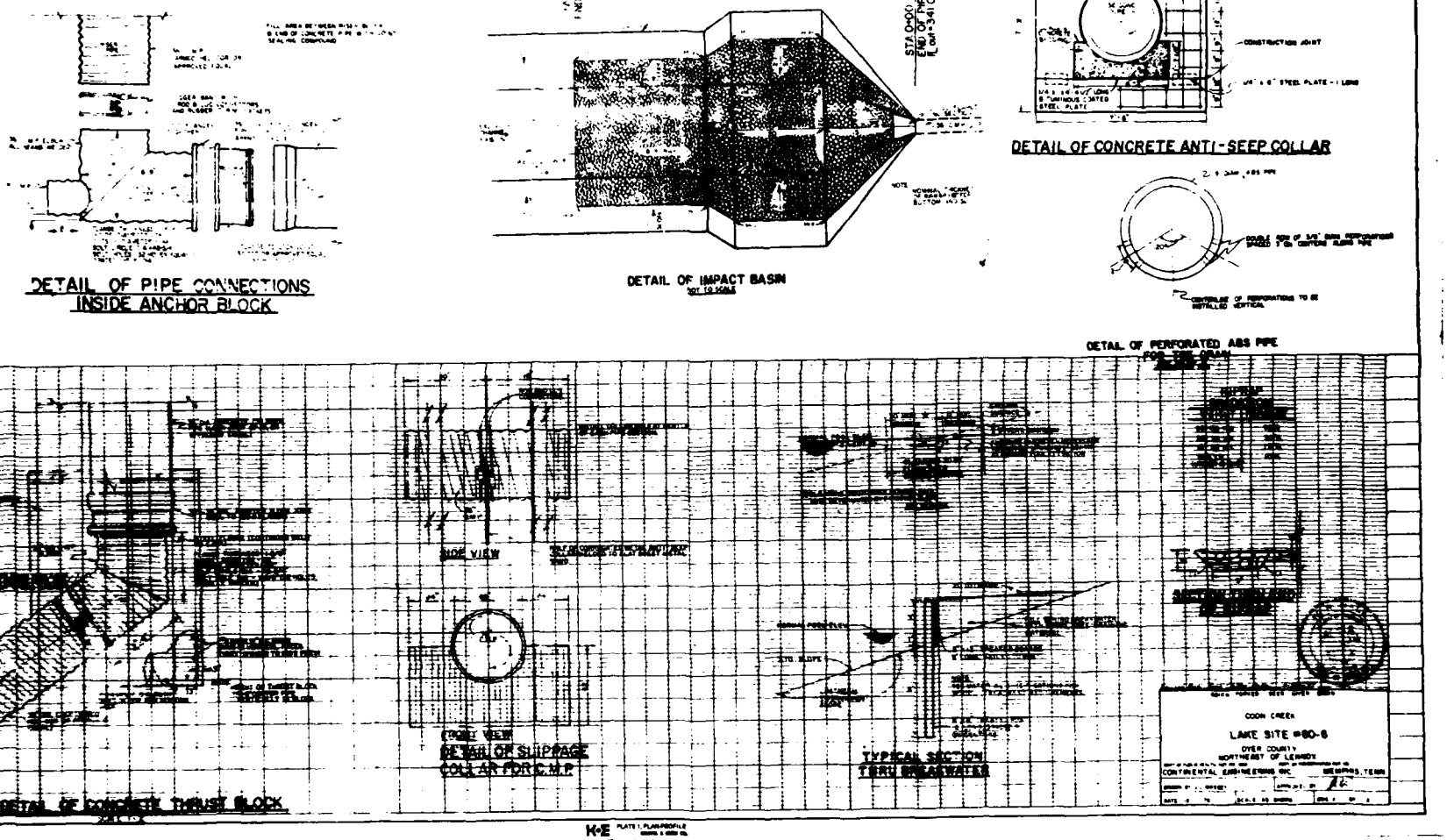
Samples above represent, as a group, the following locations in the test borings:-

Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.	Boring No.	Depth Interval, ft.
2	10'-20'						
3	10'-25'						



...IS BEST QUALITY PRACTICABLE
...FURNISHED TO DDC





K+E PLATE I, PLAN-PROFILE

QUALITY PRACTICABLE
TO DDC

APPENDIX F

HYDRAULIC AND HYDROLOGIC ANALYSES

HYDROLOGY AND HYDRAULICS

The Coon Creek Dam is in the intermediate size and high hazard potential cateogory. According to OCE guidelines, it is required to pass a Probable Maximum Flood (PMF) without overtopping. Six-hour rainfall depths for the Probable Maximum Precipitation (PMP) and the 100-year rainfall were obtained from the U. S. Weather Service TP-40.

The 6-hour PMP was estimated to be 28.9 inches producing a PMF of 23.3 inches (CN 65, AMC II). Total inflow into the reservoir is 2504 acre-feet with a peak inflow of 16,278 cfs. The emergency spillway is capable of passing the resulting runoff of 2.1 feet of freebboard.

The six-hour 100 year rainfall was estimated to be 5.3 inches producing a runoff of 3.35 inches (CN 82, AMC III). Total inflow into the reservoir is 360 acre-feet with a peak inflow of 2892 cfs. No flow would pass through the emergency spillway.

Runoff hydrographs for the drainage basin were computed using dimensionless unit hydrographs presented in Section 4, Chapter 21 of the Soil Conservation Service National Engineering Handbook. Routings through the reservoir were done using the equation:

$$I_1 + I_2 + \left(\frac{2S_1}{\Delta t} - O_1\right) = \left(\frac{2S_2}{\Delta t} + O_2\right)$$

The emergency spillway dishcarge rating curve was developed by computing backwater surface profiles and assuming a constant cross-section.

ROUTING SUMMARY

EVENT	ANTECEDENT MOISTURE CONDITION	
	II	III
PMF	Passed, 2.1 feet freeboard	Passed, 1.5 feet freeboard
½PMF	Passed, 4.8 feet freeboard	Passed, 4.3 feet freeboard
100-year	Passed, 10.1 feet freeboard	Passed, 8.9 feet freeboard

COON CREEK DAM

Basin Characteristics:		
A.	Watershed Size	1290 acres (2.015 sq. mi)
B.	Average Land Slope	17%
C.	Hydrologic Soil Groups	B (Memphis silt loam)
D.	Time of Concentration	0.72 hour
E.	SCS Runoff Curve Number	65 (AMC II)
Reservoir Characteristics:		
A.	Normal Pool Elevation	380 feet
B.	Dam Crest Elevation	391.5 feet
C.	Normal Pool Area	125 acres
D.	Normal Pool Length	8000 feet
E.	Normal Storage	2137 acre-feet
F.	Flood Storage	2825 acre-feet
G.	Maximum Storage	3900 acre-feet
Principal Spillway:		
A.	Type	36 inch diameter CMP riser
B.	Crest Elevation	380 feet
C.	Maximum Discharge Capacity	90 cfs
Emergency Spillway		
A.	Type	250 foot wide grassed channel
B.	Crest Elevation	385.6 feet
C.	Maximum Discharge Capacity	11,000 cfs

HYDROGRAPH COMPUTATION

Date
Computed by B.R.
Checked by

WATERSHED OR PROJECT Coon Creek 60-6

STATE Tenn.

STRUCTURE SITE OR SUBAREA Dyer County

DR.AREA 2.015 SQ. MI. STRUCTURE CLASS C

T_c 2.49 HR. STORM DURATION 6 HR.

POINT RAINFALL 5.3 IN.

ADJUSTED RAINFALL:

AREAL: FACTOR _____ IN. _____

DURATION: FACTOR _____ IN. _____

RUNOFF CURVE NO. 82

Q 1.35 IN.

HYDROGRAPH FAMILY NO. 2

COMPUTED T_p 0.343 HR.

T_o 5.0 HR.

(T_o/T_p):

COMPUTED 14.58 ; USED 16

REVISED T_p 0.313

$q_p = \frac{484A}{REV.T_p}$ = 3116 CFS.

$(Q)(q_p)$ = 10439 CFS.

t(COLUMN) = $(t/T_p)REV.T_p$

q(COLUMN) = $(q_c/q_p)(Q)(q_p)$

Q(COLUMN) = $(Q_t/Q)Q$

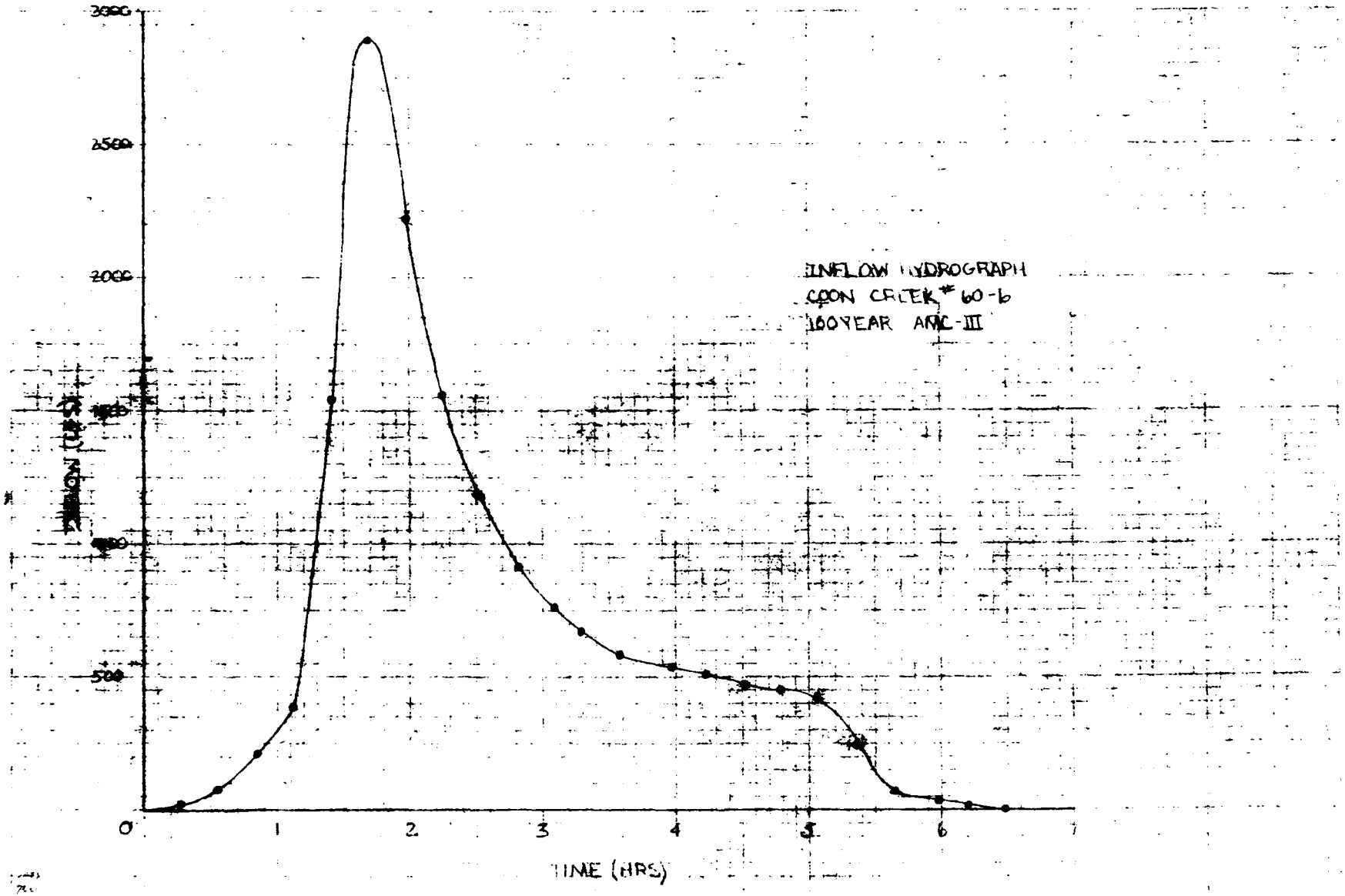
Volume Ck:

$\frac{15761\ (.28\ hr\text{-}cfs)\ (3600)}{43560} = 365$ AC-FT

$53.33 \times 3.35 \times 2.015 = 360$ AC-FT

OK

	$t=(t/T_p)Rev.T_p$	$q=(q_c/q_p)(Q)(q_p)$	$Qt=(Q_t/Q)Q$
	t HOURS	q CFS	Q INCF
1	0	0	
2	0.28	21	
3	0.56	73	
4	0.85	209	
5	1.13	386	
6	1.41	1545	
7	1.69	2892	
8	1.97	2234	
9	2.25	1555	
10	2.54	1169	
11	2.82	918	
12	3.10	762	
13	3.38	658	
14	3.66	584	
15	3.94	543	
16	4.23	501	
17	4.51	470	
18	4.79	459	
19	5.07	438	
20	5.35	240	
21	5.63	63	
22	5.92	31	
23	6.20	10	
24	6.48	0	
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			


INFLOW HYDROGRAPH
COON CREEK #60-6
100 YEAR AMC-III
3000
2500
2000
1500
1000
500
0
1
2
3
4
5
6
7
TIME (HRS)

HYDROGRAPH COMPUTATION

Date _____
Computed by _____
Checked by _____

PMF - AMC II

WATERSHED OR PROJECT _____

STATE _____

STRUCTURE SITE OR SUBAREA _____

DR.AREA 2.015 SQ. MI. STRUCTURE CLASS C

T_c 0.72 HR. STORM DURATION 6 HR.

POINT RAINFALL 28.9 IN.

ADJUSTED RAINFALL:

AREAL: FACTOR _____ IN. _____

DURATION: FACTOR _____ IN. _____

RUNOFF CURVE NO. 65

Q 22.3 IN.

HYDROGRAPH FAMILY NO. 1

COMPUTED T_p 0.504 HR.

T_o 5.5 HR.

(T_o/T_p):

COMPUTED 10.91 ; USED 10

REVISED T_p 0.55

$q_p = \frac{484A}{REV.T_p}$ = 1773 CFS.

$(Q)(q_p)$ = 41315 CFS.

t(COLUMN) = $(t/T_p)REV.T_p$

q(COLUMN) = $(q_c/q_p)(Q)(q_p)$

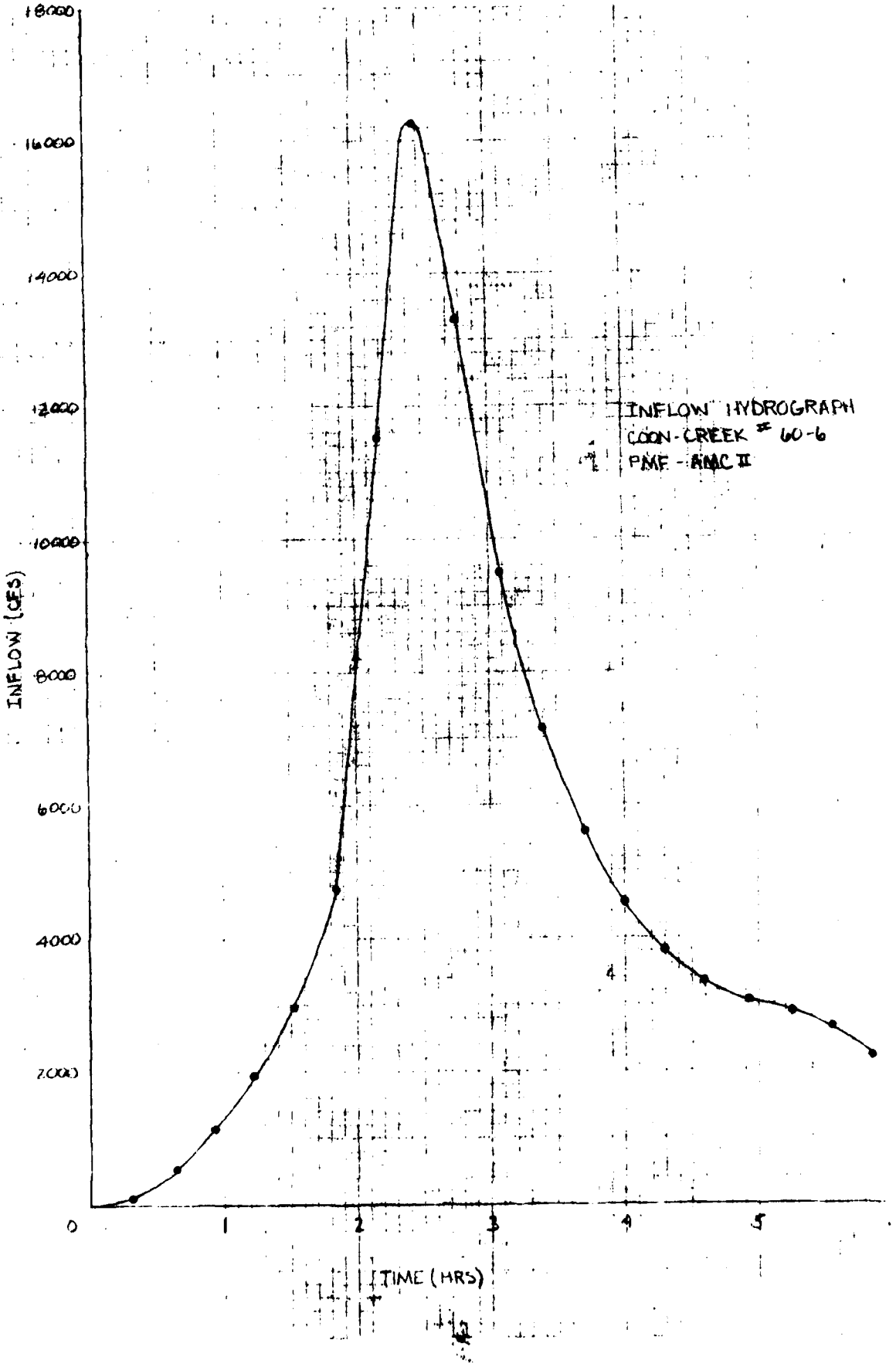
Q(COLUMN) = $(Q_t/Q)Q$

Volume CK:

$\frac{99362\ (.31\ hr.-cfs)\ (3600)}{43560} = 254$ AC-FT

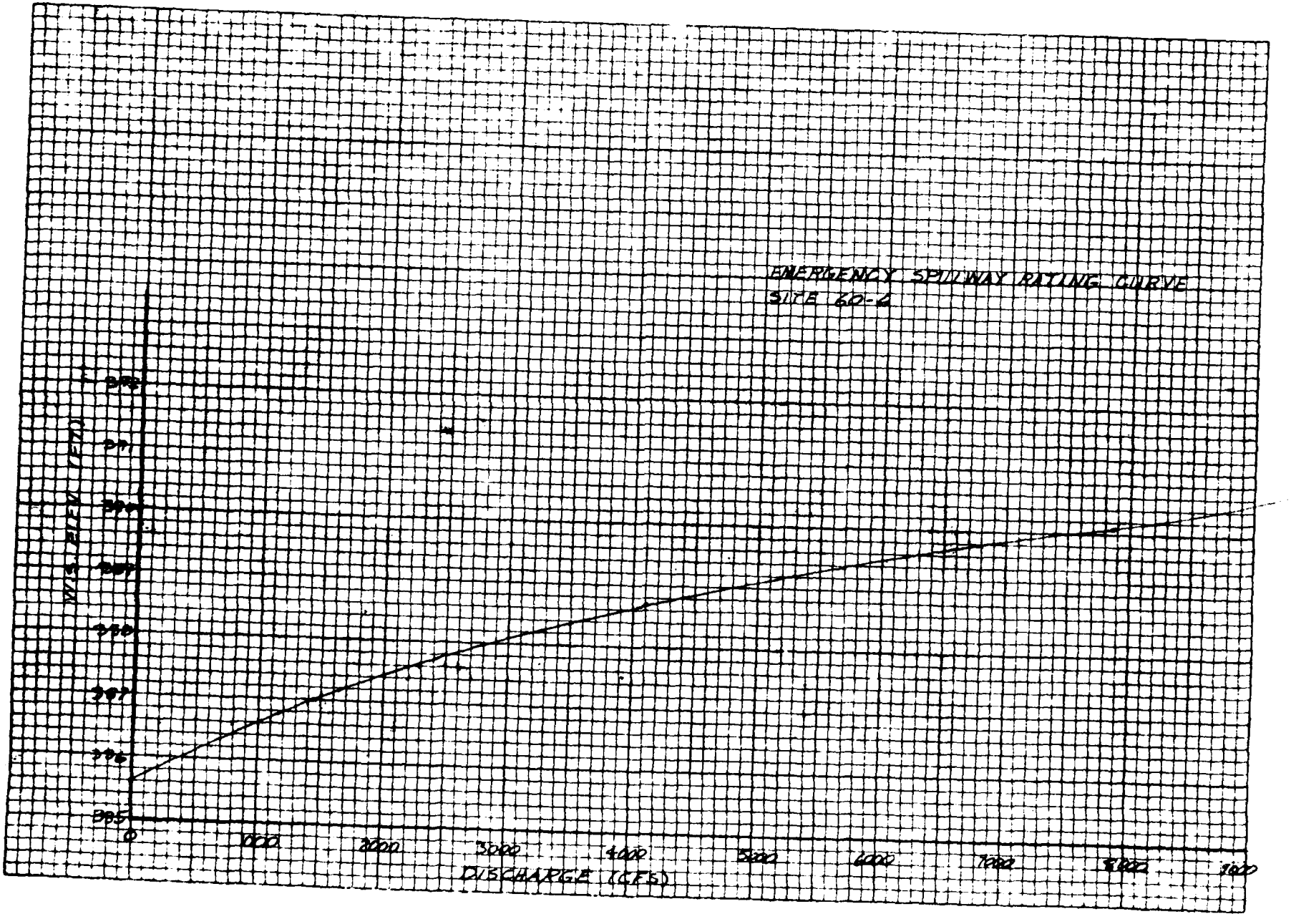
53.33 (2.015) (23.3) = 2504 AC-FT

	$t=(t/T_p)Rev.T_p$	$q=(q_c/q_p)(Q)(q_p)$	$Qt=(Q_t/Q)Q$
	t HOURS	q CFS	Q INCF
1	0	0	
2	0.31	83	
3	0.62	537	
4	0.92	1116	
5	1.23	1942	
6	1.54	2933	
7	1.85	4751	
8	2.16	11486	
9	2.46	16278	
10	2.77	13303	
11	3.08	9709	
12	3.39	7189	
13	3.70	5617	
14	4.00	4545	
15	4.31	3901	
16	4.62	3214	
17	4.93	3016	
18	5.24	2909	
19	5.54	2685	
20	5.85	2190	
21	6.16	1116	
22	6.47	476	
23	6.78	248	
24	7.08	124	
25	7.39	83	
26	7.70	40	
27	8.01	0	
28			
29			
30			
31			
32			
33			
34			


18000
16000
14000
12000
10000
8000
6000
4000
2000
0
INFLOW (CFS)
1
2
3
4
5
TIME (HRS)
INFLOW HYDROGRAPH
COON-CREEK = 60-6
PMF - ANAC II

PIPE FLOW CALCULATIONS COON CREEK # 60-6

380.0	37.25	0	WEIR FLOW
380.5	37.75	10.3	
381.0	38.25	29.2	
381.5	38.75	53.7	
382.0	39.25	80.8	PIPE FLOW
383.0	40.25	81.8	
385.0	42.25	83.9	
387.0	44.25	85.8	
388.0	45.25	86.8	
389.0	46.25	87.7	
390.0	47.25	88.7	
391.0	48.25	89.6	
391.5	48.75	90.1	



WORKING TABLE

ELEVATION	FLOOD STORAGE (ac-ft)	s(sfd)	$\frac{s}{t}$(cfs)	O(cfs)	$\frac{2s}{t} + o$
380	0	0	0	0	0
381	127	69.0	7683	29	15395
382	260	131.0	15726	81	31.527
383	397	200.1	24021	82	48.124
384	540	272.2	32677	83	65.437
385	675	340.2	40840	84	81.764
386	832	419.4	50318	445	101.141
387	994	501.0	60144	1521	121.809
388	1160	584.7	70192	2937	143.321
389	1329	669.9	80420	4898	165.725
390	1500	756.0	90756	7609	189.121
391	1671	843.8	101297	9850	212.484

AD-A108 237 TENNESSEE STATE DEPT OF CONSERVATION NASHVILLE DIV O--ETC F/G 13/13
NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE, --ETC(U)
SEP 81 R RAMSEY DACW62-81-C-0056

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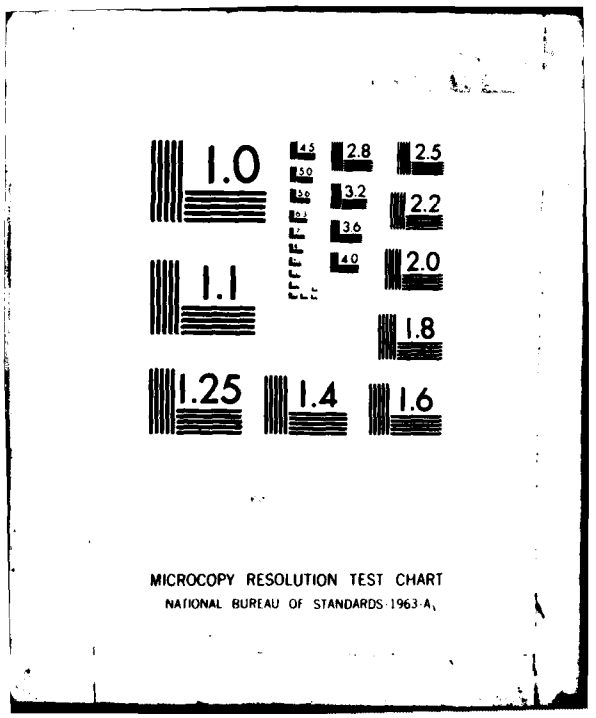
1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

100 YR AMC III

ROUTING TABLE

TIME HRS	INFLOW (cfs)	$\frac{2s}{\Delta t}$ - O(cfs)	$\frac{2s}{\Delta t}$ + O(cfs)	O(cfs)
0	0	0	0	0
0.2	15	15	15	0
0.4	40	70	70	0
0.6	95	205	205	0
0.8	185	483	485	1
1.0	300	964	968	2
1.2	520	1878	1884	3
1.4	1450	3936	3945	6
1.6	2825	8197	8221	12
1.8	2600	13778	13832	27
2.0	2130	18642	18708	33
2.2	1650	22330	22422	46
2.4	1315	25175	25295	60
2.6	1105	27465	27595	65
2.8	925	29355	29455	70
3.0	800	30920	31080	80
3.2	705	32263	32425	81
3.4	630	33436	33598	81
3.6	575	34474	34636	81
3.8	525	35427	35589	81
4.0	525	36365	36527	81
4.2	515	37248	37410	81
4.4	495	38096	38248	81
4.6	490	38864	39026	81
4.8	455	39612	39774	81
5.0	430	40328	40497	82
5.2	315	40954	41138	92

ROUTING TABLE

TIME HRS	INFLOW (cfs)	$\frac{2s}{\Delta t}$ - O(cfs)	$\frac{2s}{\Delta t}$ + O(cfs)	O(cfs)
5.4	220	41370	41524	92
5.6	95	41511	41675	82 * ELEV. 3602
5.8	50	41482	41640	79

½ PMF AMC II

ROUTING TABLE

TIME HRS	INFLOW (cfs)	$\frac{2s}{\Delta t}$ - O(cfs)	$\frac{2s}{\Delta t}$ + O(cfs)	O(cfs)
0	0	0	0	0
0.2	20	20	20	0
0.4	160	160	160	0
0.6	335	493	495	1
0.8	670	1162	1168	3
1.0	1105	2259	2267	4
1.2	1605	3857	3869	6
1.4	2165	6047	6067	10
1.6	2835	8982	9012	15
1.8	3585	12867	12917	25
2.0	4435	19034	19107	34
2.2	5385	28954	29084	65
2.4	6435	42942	43104	82
2.6	7585	58541	58715	83
2.8	8835	72556	72754	99
3.0	9985	84056	84256	100
3.2	10935	92866	93066	300
3.4	11485	99776	100676	450
3.6	11735	105051	106401	675
3.8	11885	108526	110676	875
4.0	11985	111799	113799	1000
4.2	12035	113672	115972	1125
4.4	12085	114522	116772	1250
4.6	12085	114522	116772	1250
4.8	12085	115502	116122	1100

*ELEV 3[illegible] 7

Coon Creek # 60-6

ROUTING TABLE
PMF-AMC-II

TIME HRS	INFLOW (cfs)	$\frac{2s}{\Delta t}$ - O(cfs)	$\frac{2s}{\Delta t}$ + O(cfs)	O(cfs)
0	0	0	0	0
0.2	60	60	60	0
0.4	200	320	320	0
0.6	470	986	990	2
0.8	880	2328	2336	4
1.0	1330	4524	4538	7
1.2	1890	7722	7744	11
1.4	2570	12092	12142	25
1.6	3400	17958	18022	33
1.8	4470	25708	25828	60
2.0	6000	38016	38179	81
2.2	12100	57950	58116	83
2.4	16700	85950	86250	150
2.6	15250	115000	117500	1250
2.8	13000	13735	143350	2000
3.0	10400	15235	160250	4200
3.2	8420	160970	171170	5100
3.4	7200	165240	176590	5675
3.6	6050	166690	178490	5900 + ELEV
3.8	5200	166240	177940	5850
4.0	4545	164785	175985	5600

APPENDIX G

CORRESPONDENCE

TENNESSEE DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
4721 TROUSDALE DRIVE, NASHVILLE 37220
615/741-6660

Certified

December 1, 1980

Obion-Forked Deer Basin Authority
Box 34, State Office Building
225 Madison Avenue
Jackson, TN 38301

Dear Dam Owner:

As provided by the State Safe Dams Act, Tennessee Code Annotated, Sections 70-2501 to 70-2530, non-federal dams in Tennessee must be inspected and certified for safety by our agency. According to our records, you are identified as the owner of Coon Ck Site #60-(Dam, located in Dyer County, Tennessee. Enclosed for your information and review is a copy of our inventory record on the structure along with a copy of the Act and adopted rules and regulations.

Tentative plans are to schedule a safety inspection of your dam within the next few months. A staff engineer will very shortly be in further communication with you to discuss the pending inspection and your responsibilities under the Safe Dams Act. Your immediate attention, however, is called to the matter of maintaining the earthen dam with a good grass cover and clear of all brush, undergrowth and tree growth. If these conditions do not presently exist, please make plans to remove the brush, undergrowth and all trees less than two inches in diameter as soon as possible. Larger trees may have to be removed at a later date but must be done so under the direction of an experienced engineer.

Please let me, or our Chief Engineer, Mr. Ed O'Neill, know of any assistance we might be.

Very truly yours,

Robert A. Hunt, P.E.
Director, Division of Water Resources

RAH:lt

Enclosures

SPIGOLON - DISC
DIVISION OF DEVELOPERS INTERNATIONAL SERVICES CORPORATION
ENGINEERING □ TESTING □ INSPECTION □ DRILLING

April 08, 1977
Serial No. N-372
Job No. G-258

Obion Forked Deer Basin Authority
c/o Continental Engineering Inc.
Suite 501, Directors Plaza
3035 Directors Row
Memphis, Tennessee 38131

Ref: Lake & Dam 60-6
Coon Creek
Dyer County, Tennessee

Gentlemen:-

In a letter dated January 13, 1977, the regional engineer of the Tennessee Division of Water Resources, Mr. E.B. O'Neill, recommended that the potential for sand boils at the toe of the subject dam be reviewed. We have again calculated the possibility of uplift at the downstream toe. Reference is made to our geotechnical report for the project, dated November 30, 1976. Our findings and recommendations are as follows:-

(A) The head at the downstream toe is affected by the length of upstream blanket, length of downstream blanket, thickness of blanket, and location of a blockage, if any, in the downstream pervious layer.

(B) Safety against toe uplift, assuming a 12 ft. thick layer of semi-pervious blanket over the granular layer, requires at least 100 ft. of unbroken blanket upstream and no blockage downstream for a 43 ft. head.

(C) If the pervious stratum is blocked within 400 ft. of the downstream toe, then toe uplift pressures can cause upheaval with sand boils or piping.

(D) Without extensive (and expensive) additional field investigation, which may not be conclusive, only two alternatives are available, considering the height and importance of the dam. These are observation using piezometers or the use of a pressure relief trench.

(E) The observational approach would use a series of piezometers to observe uplift pressures at the toe. If these indicate a downstream blockage, then pressure relief well must be installed. Designs for piezometer installation and relief wells can be supplied if needed. This method can only work after completion and partial filling of the dam.

P. O. BOX 161158 □ 3438 FONTAINE ROAD □ MEMPHIS, TENNESSEE 38116 □ PHONE (901) 396-0461

Lake & Dam 60-6
Coon Creek
Dyer County, Tennessee
April 08, 1977

(F) The most secure solution is to install pressure relief trenches now, as a precaution whether they are absolutely necessary or not. The present cost will not be great.

(G) Referring to Figure 3 of our November 30 report, a relief trench may be installed as part of the toe drain system. At the extreme downstream end of the drain, extend the lowered portion that contains the drain pipe downward to a depth of about 14 ft. to completely intercept the pervious layer. The trench need not be over about three ft. wide and only extend over the central two-thirds of the length of the dam. The same drain material used for the toe drain should be used. The drain pipe may be placed at any convenient depth, from bottom of trench to a few feet from ground surface. It should, of course, drain downstream into the existing stream bed.

Although, as we originally assumed in our report, the calculations show the downstream toe to be safe from uplift, the small probability of a downstream blockage compared to the low cost of a remedial measure and the importance of the dam suggests that either of the two systems described above be used.

Very truly yours,

S.J. Spigolon, P.E.
Soil Engineer

NON-FEDERAL DAM INSPECTION REVIEW BOARD
PO BOX 1070
NASHVILLE, TENNESSEE 37202

ORNED-G

Commander
US Army Engineer District, Nashville
PO Box 1070
Nashville, TN 37202

1. The Interagency Review Board, appointed by the District Engineer on 8 October 1980, presents the following recommendations after meeting on 21 May 1981 to consider the Phase I investigation report on OFDBA Site 60-6 (Coon Creek Dam) inspected by the Tennessee Department of Conservation.

2. The condition classification should be changed from "significantly deficient" to "unsafe-nonemergency."

3. The board is in agreement with other report conclusions and recommendations following minor revisions.

FRANK B. COUCH, JR.
Chief, Geotechnical Branch
Chairman

JAMES SIMS
Design Engineer
Alternate, Soil Conservation Service

ROBERT A. HUNT
Director, Div of Water Resources
State of Tennessee

H. F. PHILLIPS
Chief, Hydraulics Section
Alternate, Hydrology & Hydraulics Branch

EDWARD B. BOYD
Hydrologic Technician
Alternate, US Geological Survey

L. E. LOCKETT
Structural Engineer
Alternate, Design Branch

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

2 JUN 1981

IN REPLY REFER TO

ORNED-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Please be informed of the results of an inspection, under authority of Public Law 92-367, conducted on OFDBA Site No. 60-6 (Coon Creek Dam) in Dyer County, Tennessee. An inspection team, composed of personnel from your Division of Water Resources, observed conditions which indicate a high potential for failure of the embankment dam due to the presence of numerous, large sinkholes downstream of the right toe.

OFDBA Site No. 60-6 (Coon Creek Dam) is classified as a high hazard potential, intermediate size dam, and as such, should be able to regulate a probable maximum flood (PMF) to conform to inspection program guidelines. An analysis of the hydrology associated with the dam reveals that it can regulate an inflow in excess of a probable maximum flood.

In view of the presence of these large sinkholes downstream of the toe, this dam is considered unsafe. While I do not view this as an emergency at this time, I recommend you initiate prompt action by the State to cause the owner to correct this serious deficiency to minimize the risk to numerous family dwellings, a church and a school located downstream from the dam.

A report of the technical investigation will be furnished your office upon completion.

Sincerely,

LEE W. TUCKER
Colonel, Corps of Engineers
Commander

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220

END

DATE
FILMED

1-82

DTIC